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Lombardo

(10) **Patent No.: US 8,171,387 B2**
(45) **Date of Patent: May 1, 2012**

(54) **METHOD OF AND SYSTEM FOR COLLABORATION WEB-BASED PUBLISHING**

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(73) Assignee: **Boardwalk Collaboration, Inc.**, San Francisco, CA (US)

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(21) Appl. No.: **10/846,094**

(22) Filed: **May 13, 2004**

(65) **Prior Publication Data**

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(51) **Int. Cl.**
G06N 3/00 (2006.01)

(52) **U.S. Cl.** **715/200**

(58) **Field of Classification Search** 715/234, 715/243, 254, 200

See application file for complete search history.

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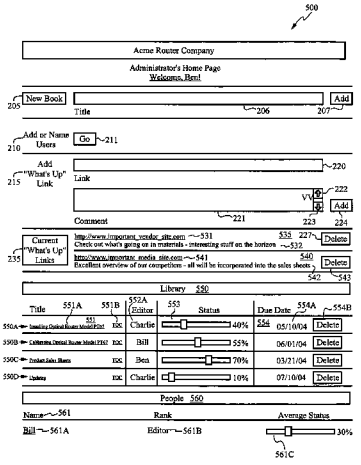
Primary Examiner — Kyle Stork

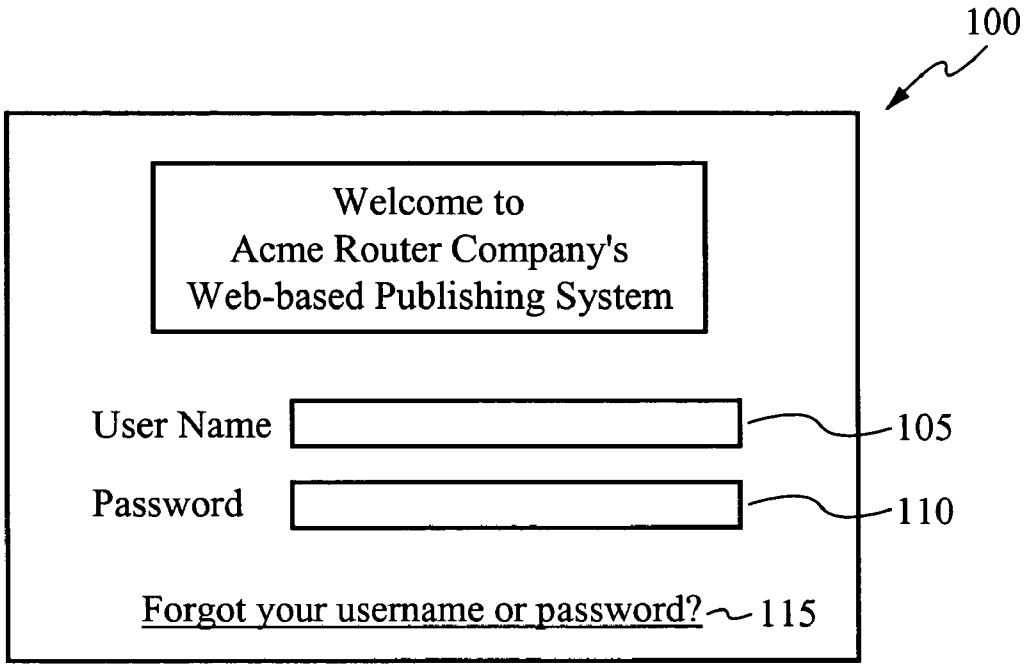
(74) *Attorney, Agent, or Firm* — Haverstock & Owens LLP

(57) **ABSTRACT**

A system and method directed to controlling work flow for a document is disclosed. The system comprises a document control module comprising a document engine and a document portion, a workflow control module for tracking and assigning work on the document portion, and a Web-based interface coupled to the document control module and the workflow control module. The system is configured to couple to a remote host over a network such as the Internet. Preferably, the document is automatically formatted to include XML tags, which allows the document to be searched and otherwise controlled more easily. Preferably, the system also comprises a search engine for searching through the document portion using a variety of search criteria. Preferably, the system is configured to import search results into the document.

52 Claims, 22 Drawing Sheets

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Welcome to
Acme Router Company's
Web-based Publishing System
User Name
105
Password
110
Forgot your username or password?
115

Fig. 1

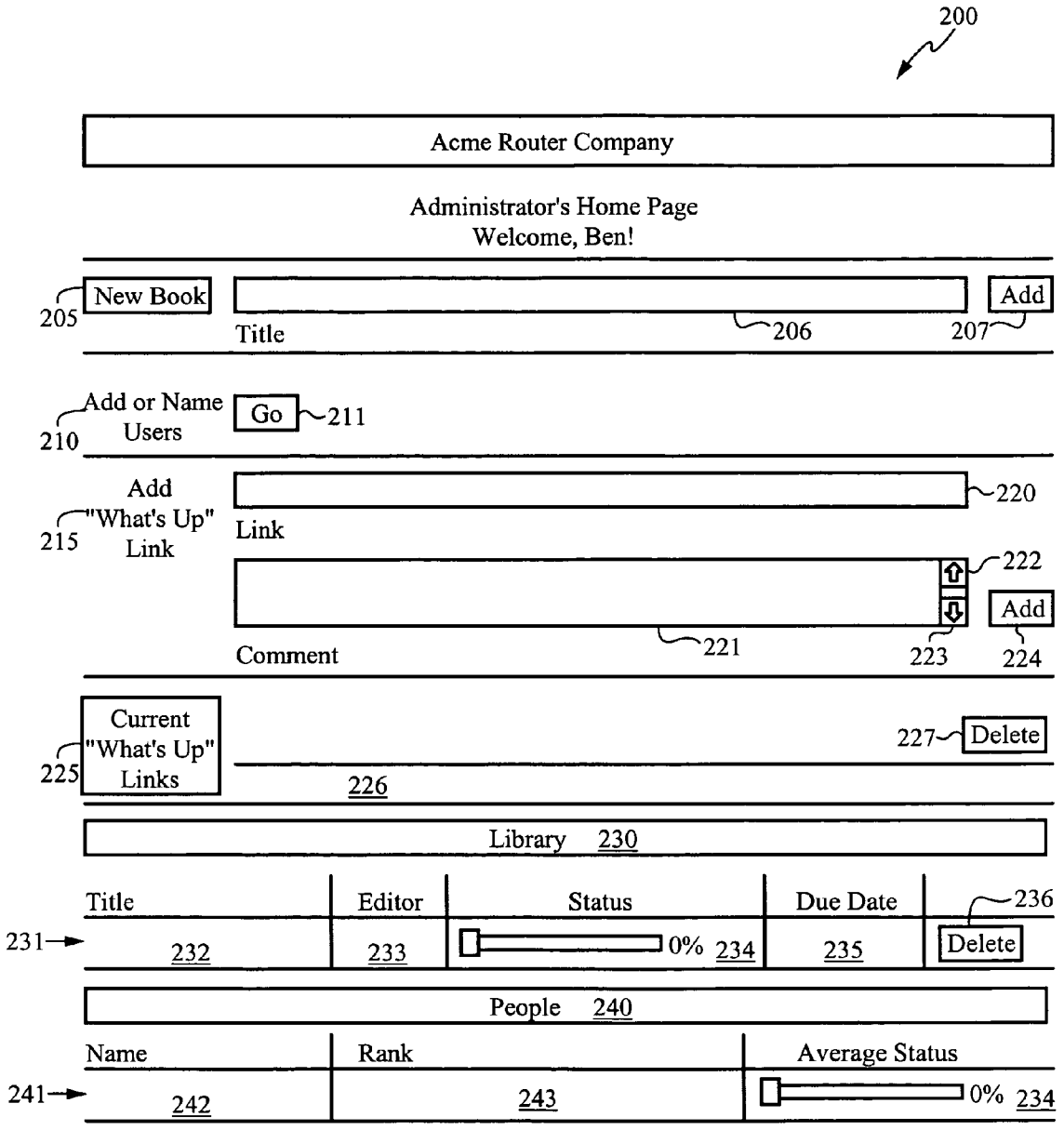
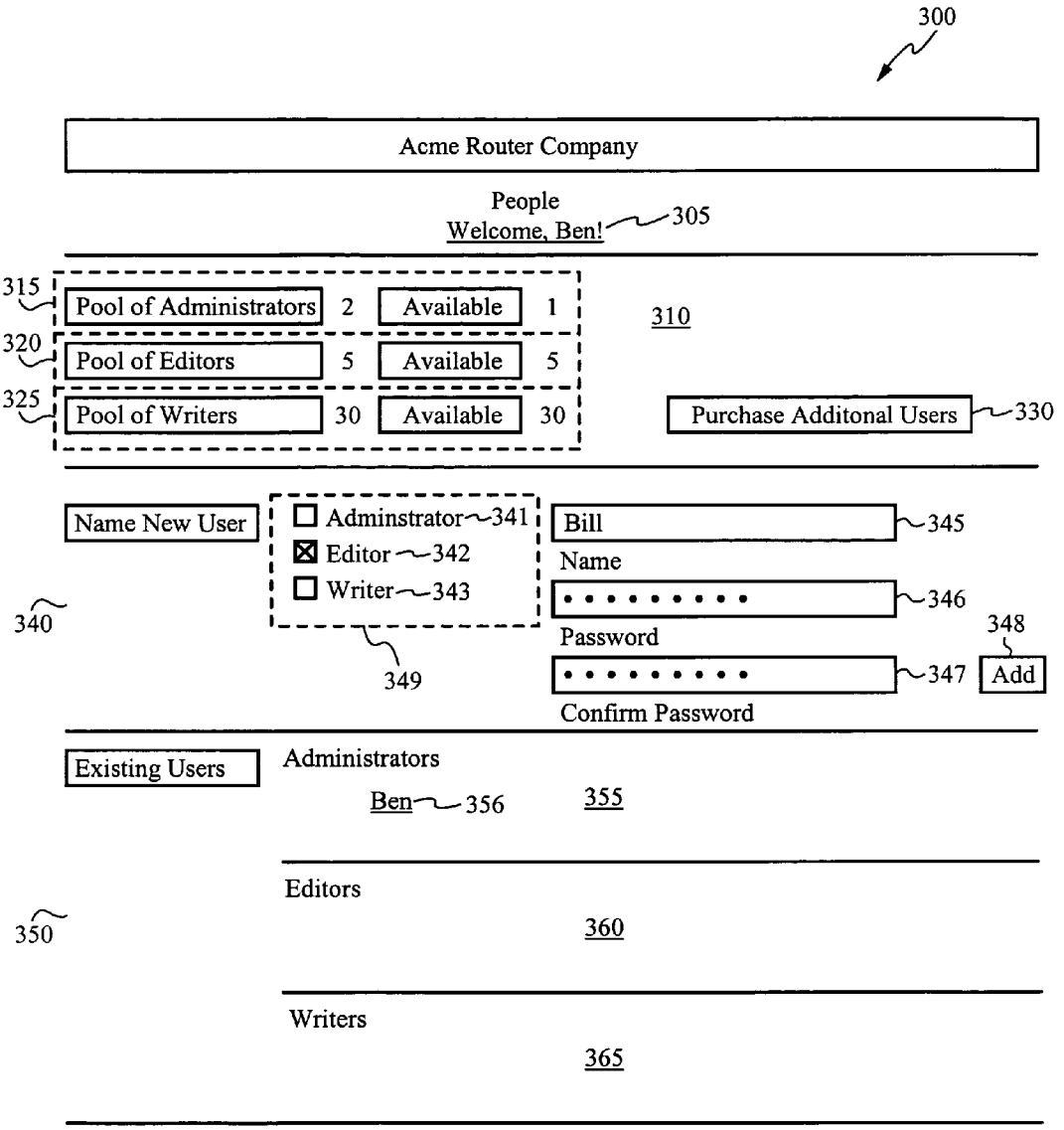

200
Acme Router Company
Administrator's Home Page
Welcome, Ben!
205
New Book
Title
206
207
Add
210
Add or Name Users
Go
211
215
Add "What's Up" Link
Link
220
222
Comment
221
223
Add
224
225
Current "What's Up" Links
227
Delete
226
Library 230
Title
Editor
Status
Due Date
236
231
232
233
0%
234
235
Delete
People 240
Name
Rank
Average Status
241
242
243
0%
234

Fig. 2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Acme Router Company
People
Welcome, Ben!
305
315
Pool of Administrators
2
Available
1
320
Pool of Editors
5
Available
5
325
Pool of Writers
30
Available
30
310
Purchase Additonal Users
330
Name New User
Adminstrator
341
Editor
342
Writer
343
340
349
Bill
345
Name
346
Password
347
348
Add
Confirm Password
Existing Users
Administrators
Ben
356
355
Editors
360
350
Writers
365

Fig. 3

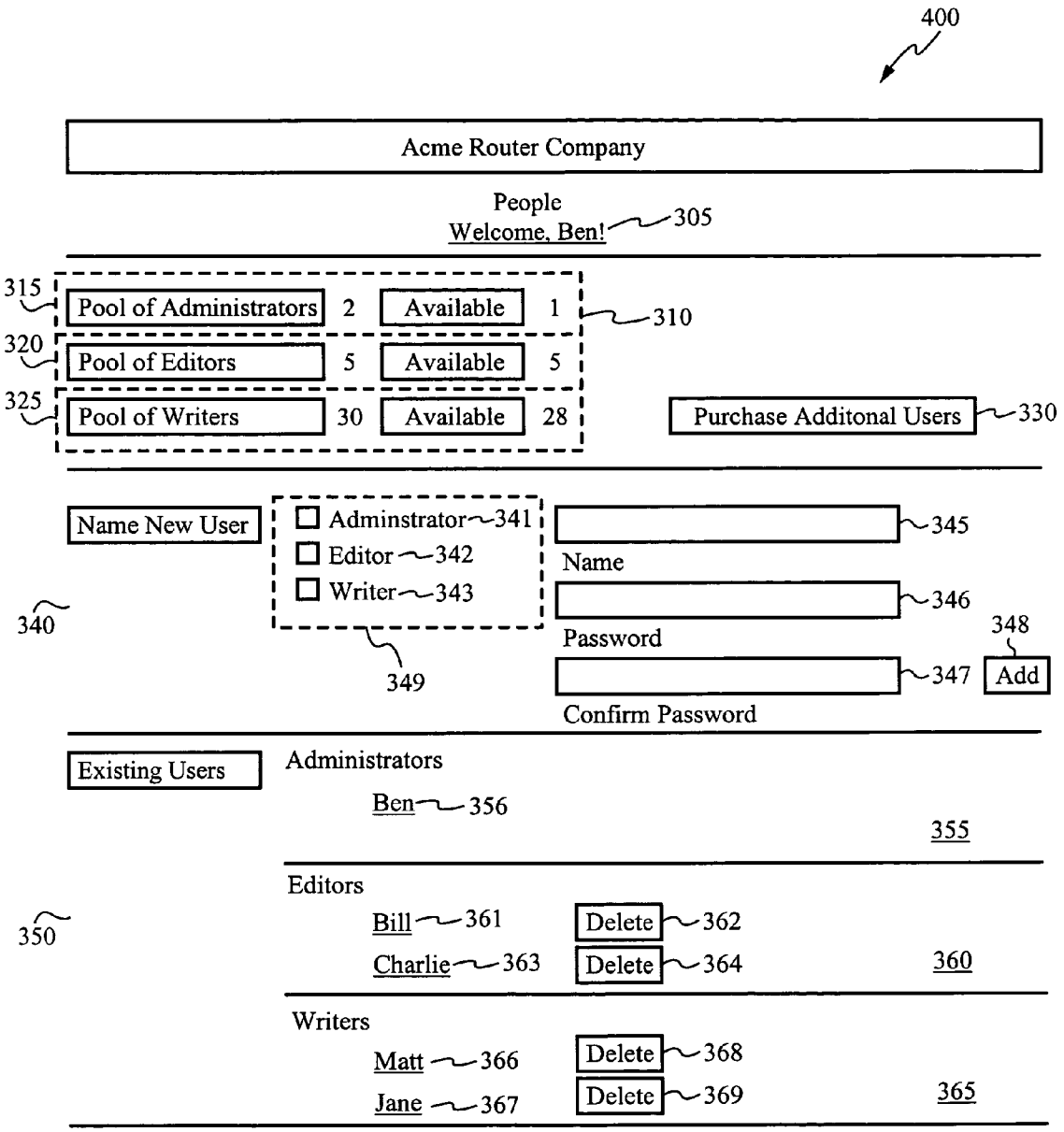

400
Acme Router Company
People
Welcome, Ben!
305
315
Pool of Administrators
2
Available
1
310
320
Pool of Editors
5
Available
5
325
Pool of Writers
30
Available
28
Purchase Additonal Users
330
Name New User
Adminstrator
341
Editor
342
Writer
343
340
349
345
Name
346
Password
348
347
Add
Confirm Password
Existing Users
Administrators
Ben
356
355
Editors
350
Bill
361
Delete
362
Charlie
363
Delete
364
360
Writers
Matt
366
Delete
368
Jane
367
Delete
369
365

Fig. 4

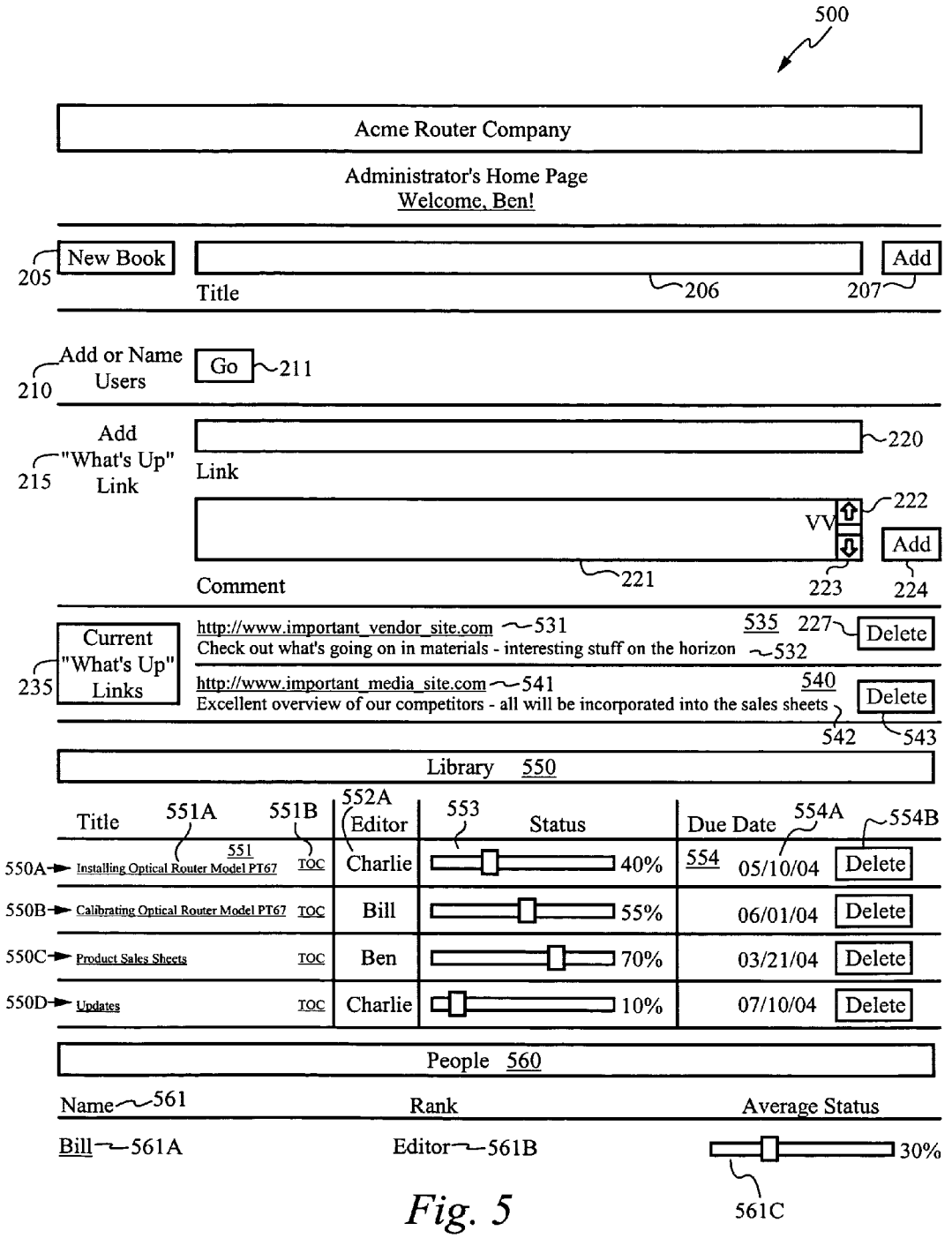
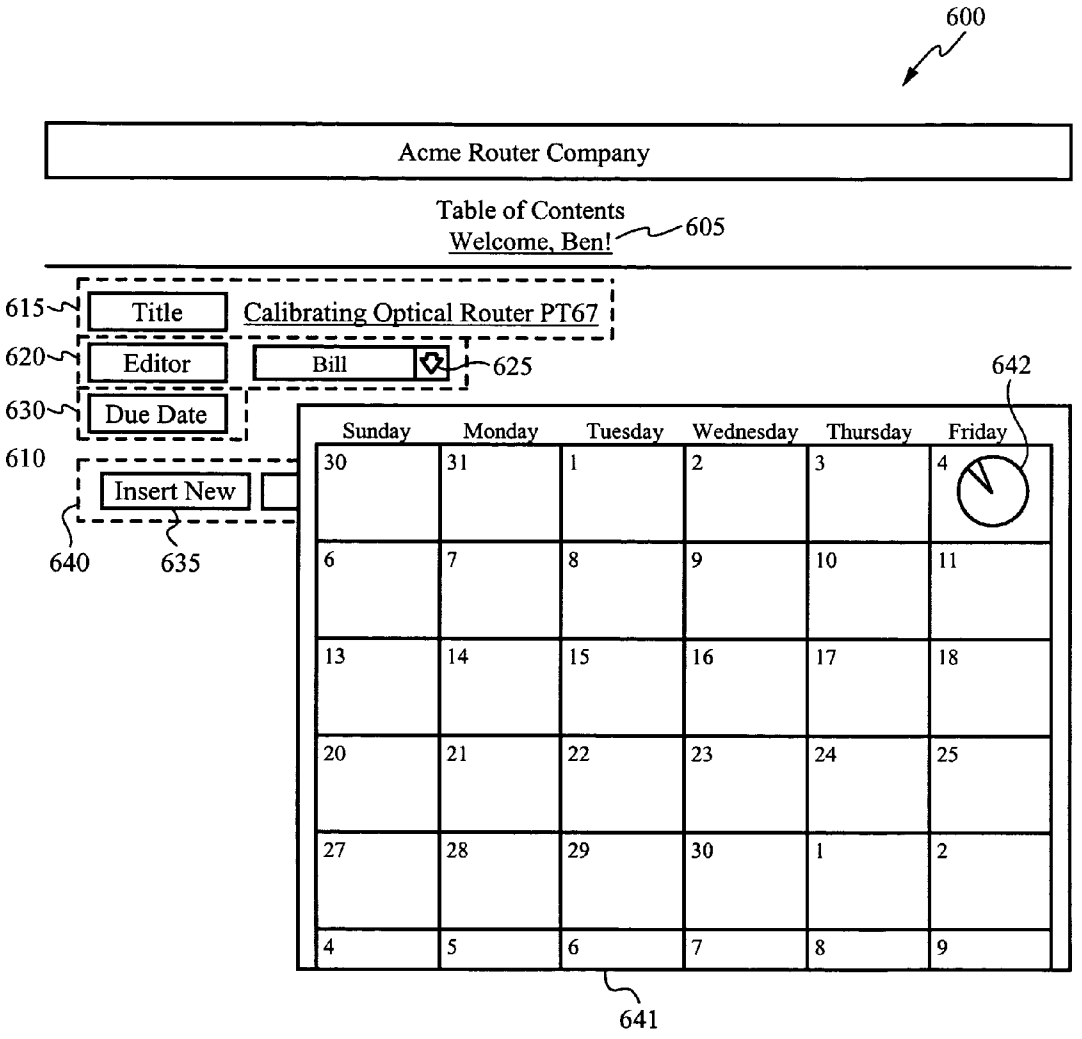

500
Acme Router Company
Administrator's Home Page
Welcome, Ben!
205
New Book
Title
206
207
Add
210
Add or Name Users
Go
211
215
Add "What's Up" Link
Link
220
222
VV
Add
Comment
221
223
224
235
Current "What's Up" Links
http://www.important_vendor_site.com
531
535
227
Delete
Check out what's going on in materials - interesting stuff on the horizon
532
http://www.important_media_site.com
541
540
Delete
Excellent overview of our competitors - all will be incorporated into the sales sheets
542
543
Library 550
Title
551A
551
551B
552A
Editor
553
Status
Due Date
554A
554B
550A
Installing Optical Router Model PT67
TOC
Charlie
40%
554
05/10/04
Delete
550B
Calibrating Optical Router Model PT67
TOC
Bill
55%
06/01/04
Delete
550C
Product Sales Sheets
TOC
Ben
70%
03/21/04
Delete
550D
Updates
TOC
Charlie
10%
07/10/04
Delete
People 560
Name
561
Rank
Average Status
Bill
561A
Editor
561B
30%
561C

Fig. 5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Acme Router Company
Table of Contents
Welcome, Ben!
605
615
Title
Calibrating Optical Router PT67
620
Editor
Bill
625
630
Due Date
610
Insert New
640
635
642
Sunday
Monday
Tuesday
Wednesday
Thursday
Friday
30 31 1 2 3 4
6 7 8 9 10 11
13 14 15 16 17 18
20 21 22 23 24 25
27 28 29 30 1 2
4 5 6 7 8 9
641

Fig. 6

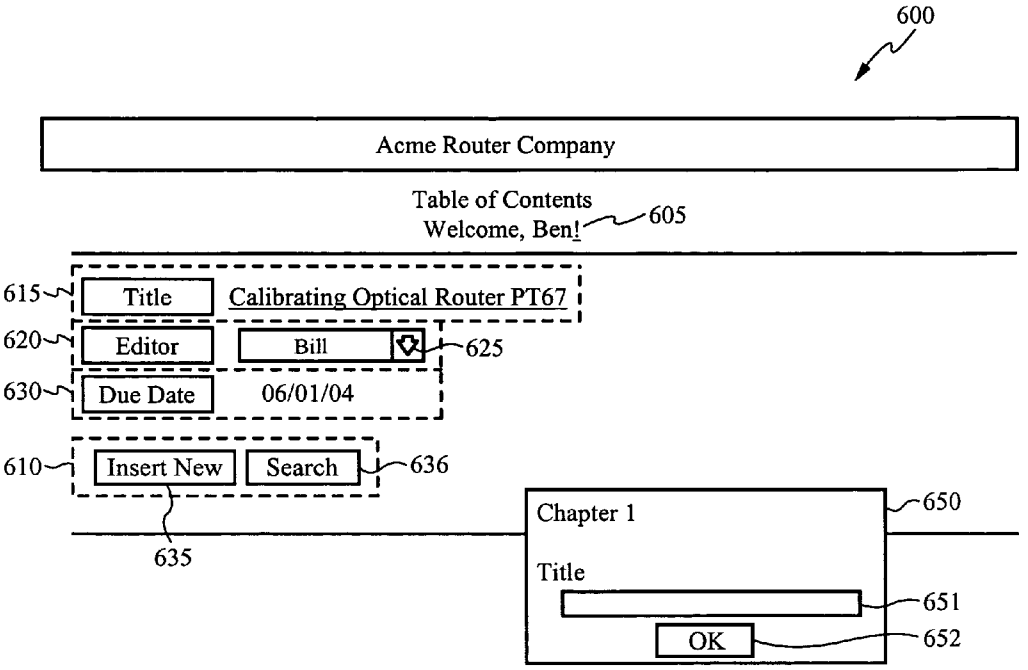

600
Acme Router Company
Table of Contents
Welcome, Ben!
605
615
Title
Calibrating Optical Router PT67
620
Editor
Bill
625
630
Due Date
06/01/04
610
Insert New
Search
636
635
Chapter 1
650
Title
651
OK
652

Fig. 7

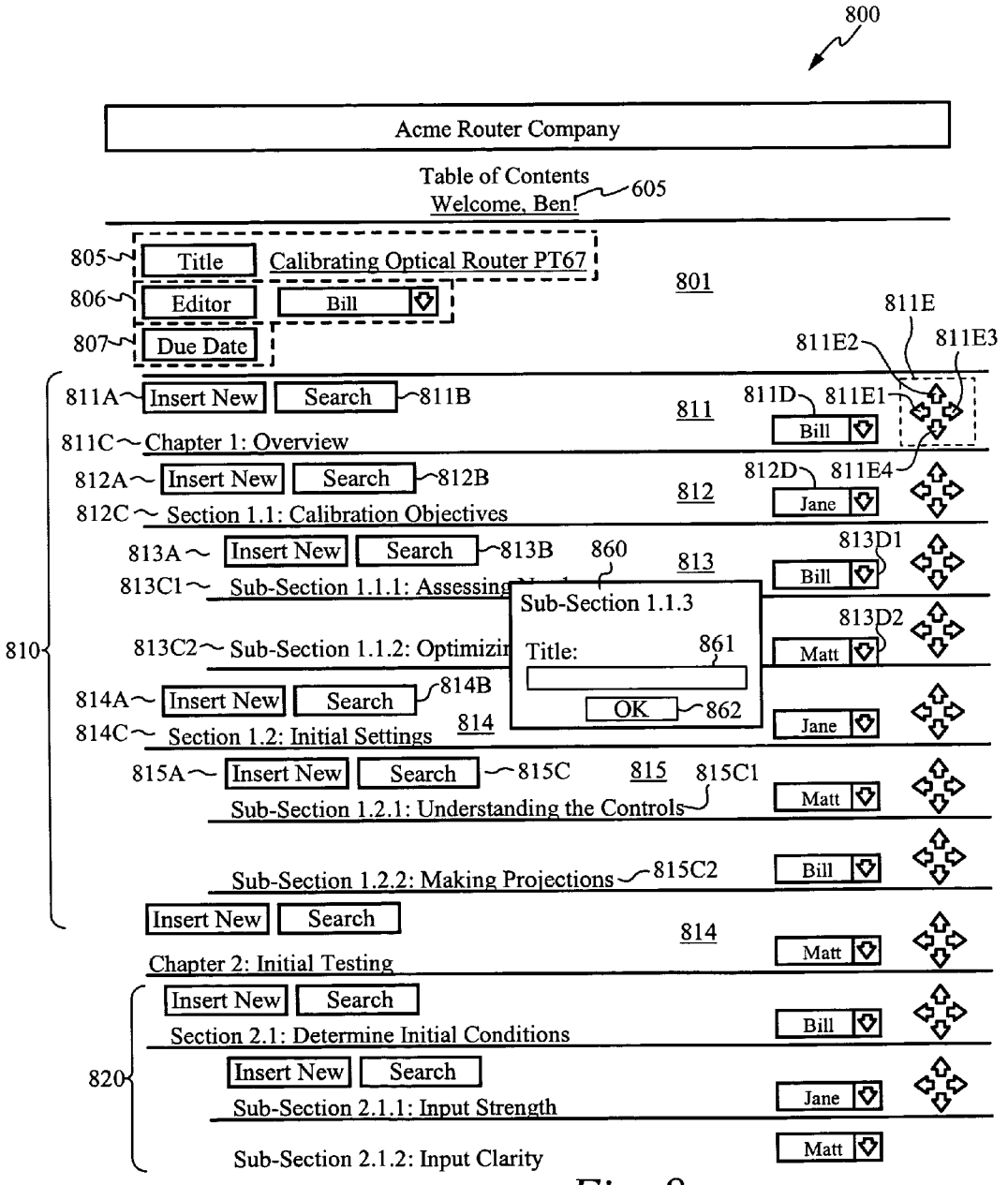
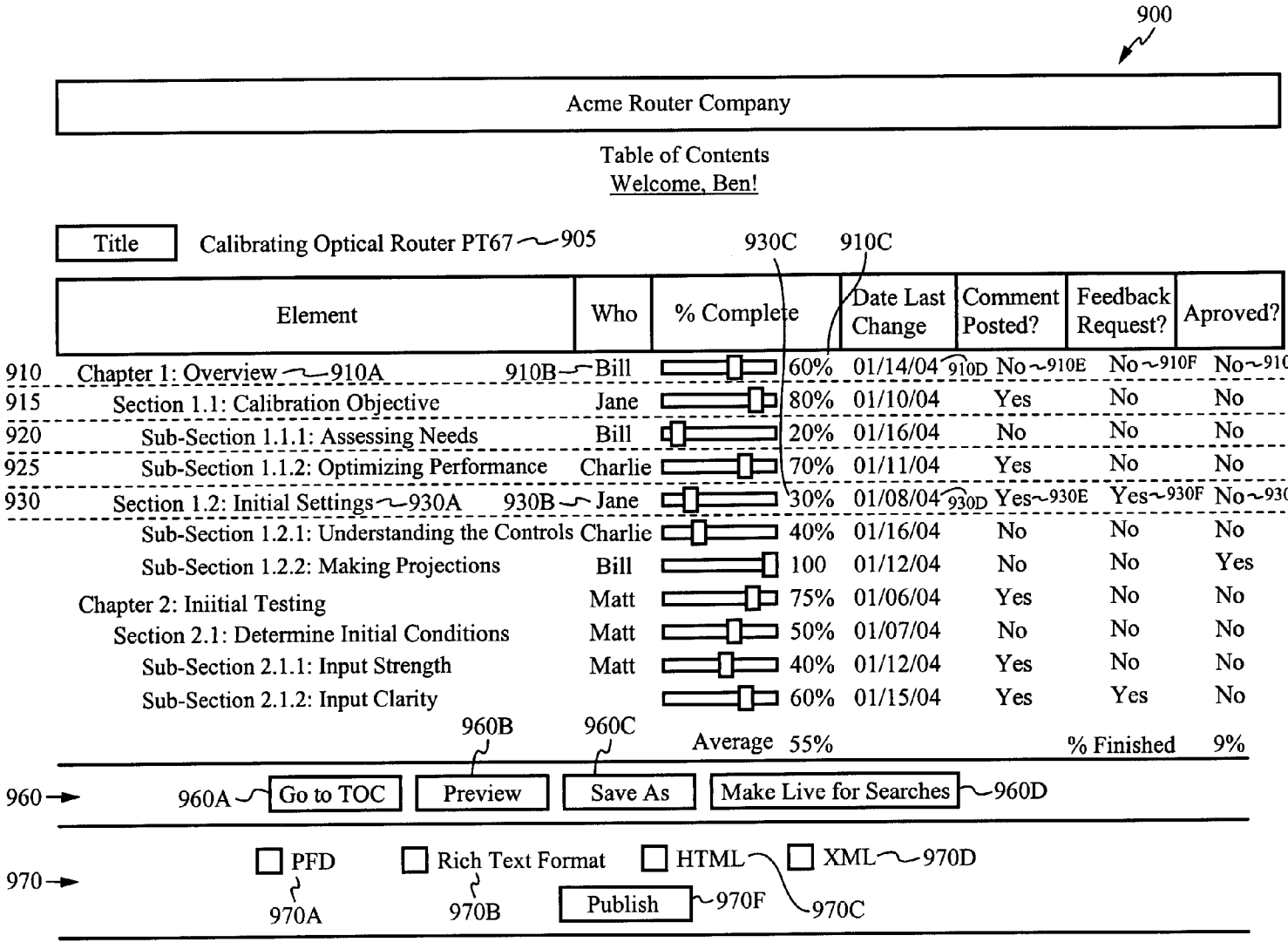

800
Acme Router Company
Table of Contents
Welcome, Ben!
605
805
Title
Calibrating Optical Router PT67
806
Editor
Bill
807
Due Date
801
811E
811E2
811E3
811A
Insert New
Search
811B
811
811D
811E1
Bill
811C
Chapter 1: Overview
812A
Insert New
Search
812B
812
812D
811E4
Jane
812C
Section 1.1: Calibration Objectives
813A
Insert New
Search
813B
860
813
813D1
Bill
813C1
Sub-Section 1.1.1: Assessing
Sub-Section 1.1.3
Title:
861
OK
862
813D2
Matt
810
813C2
Sub-Section 1.1.2: Optimizi
814A
Insert New
Search
814B
814C
Section 1.2: Initial Settings
814
Jane
815A
Insert New
Search
815C
815
815C1
Matt
Sub-Section 1.2.1: Understanding the Controls
Sub-Section 1.2.2: Making Projections
815C2
Bill
Insert New
Search
814
Matt
Chapter 2: Initial Testing
Insert New
Search
Bill
Section 2.1: Determine Initial Conditions
820
Insert New
Search
Jane
Sub-Section 2.1.1: Input Strength
Matt
Sub-Section 2.1.2: Input Clarity

Fig. 8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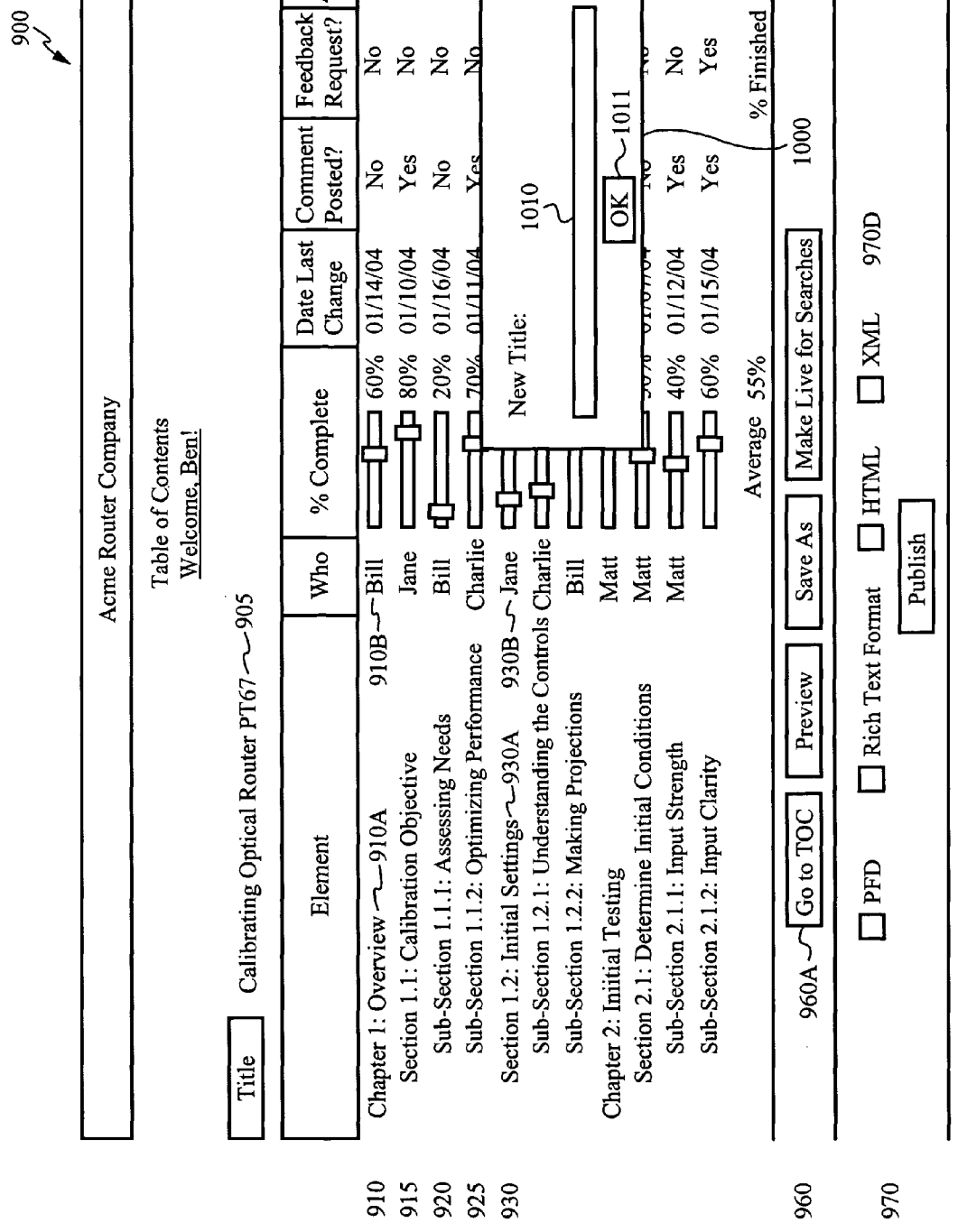
Acme Router Company
Table of Contents
Welcome, Ben!
Title
Calibrating Optical Router PT67
905
930C
910C
Element
Who
% Complete
Date Last Change
Comment Posted?
Feedback Request?
Aproved?
910
Chapter 1: Overview
910A
910B
Bill
60%
01/14/04
910D
No
910E
No
910F
No
910G
915
Section 1.1: Calibration Objective
Jane
80%
01/10/04
Yes
No
No
920
Sub-Section 1.1.1: Assessing Needs
Bill
20%
01/16/04
No
No
No
925
Sub-Section 1.1.2: Optimizing Performance
Charlie
70%
01/11/04
Yes
No
No
930
Section 1.2: Initial Settings
930A
930B
Jane
30%
01/08/04
930D
Yes
930E
Yes
930F
No
930G
Sub-Section 1.2.1: Understanding the Controls
Charlie
40%
01/16/04
No
No
No
Sub-Section 1.2.2: Making Projections
Bill
100
01/12/04
No
No
Yes
Chapter 2: Iniitial Testing
Matt
75%
01/06/04
Yes
No
No
Section 2.1: Determine Initial Conditions
Matt
50%
01/07/04
No
No
No
Sub-Section 2.1.1: Input Strength
Matt
40%
01/12/04
Yes
No
No
Sub-Section 2.1.2: Input Clarity
60%
01/15/04
Yes
Yes
No
960B
960C
Average
55%
% Finished
9%
960
960A
Go to TOC
Preview
Save As
Make Live for Searches
960D
970
PFD
970A
Rich Text Format
970B
HTML
XML
970D
Publish
970F
970C

Fig. 9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Acme Router Company
Table of Contents
Welcome, Ben!
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Calibrating Optical Router PT67
905
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Who
% Complete
Date Last Change
Comment Posted?
Feedback Request?
Aprov
Chapter 1: Overview
910A
910B
Bill
60%
01/14/04
No
No
No
Section 1.1: Calibration Objective
Jane
80%
01/10/04
Yes
No
No
Sub-Section 1.1.1: Assessing Needs
Bill
20%
01/16/04
No
No
No
Sub-Section 1.1.2: Optimizing Performance
Charlie
70%
01/11/04
Yes
No
No
Section 1.2: Initial Settings
930A
930B
Jane
New Title:
1010
OK
1011
No
Sub-Section 1.2.1: Understanding the Controls
Charlie
No
Sub-Section 1.2.2: Making Projections
Bill
Yes
Chapter 2: Initial Testing
Matt
No
Section 2.1: Determine Initial Conditions
Matt
No
Sub-Section 2.1.1: Input Strength
Matt
40%
01/12/04
Yes
No
No
Sub-Section 2.1.2: Input Clarity
60%
01/15/04
Yes
Yes
No
Average 55%
% Finished 9%
910
915
920
925
930
960
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960A
Go to TOC
Preview
Save As
Make Live for Searches
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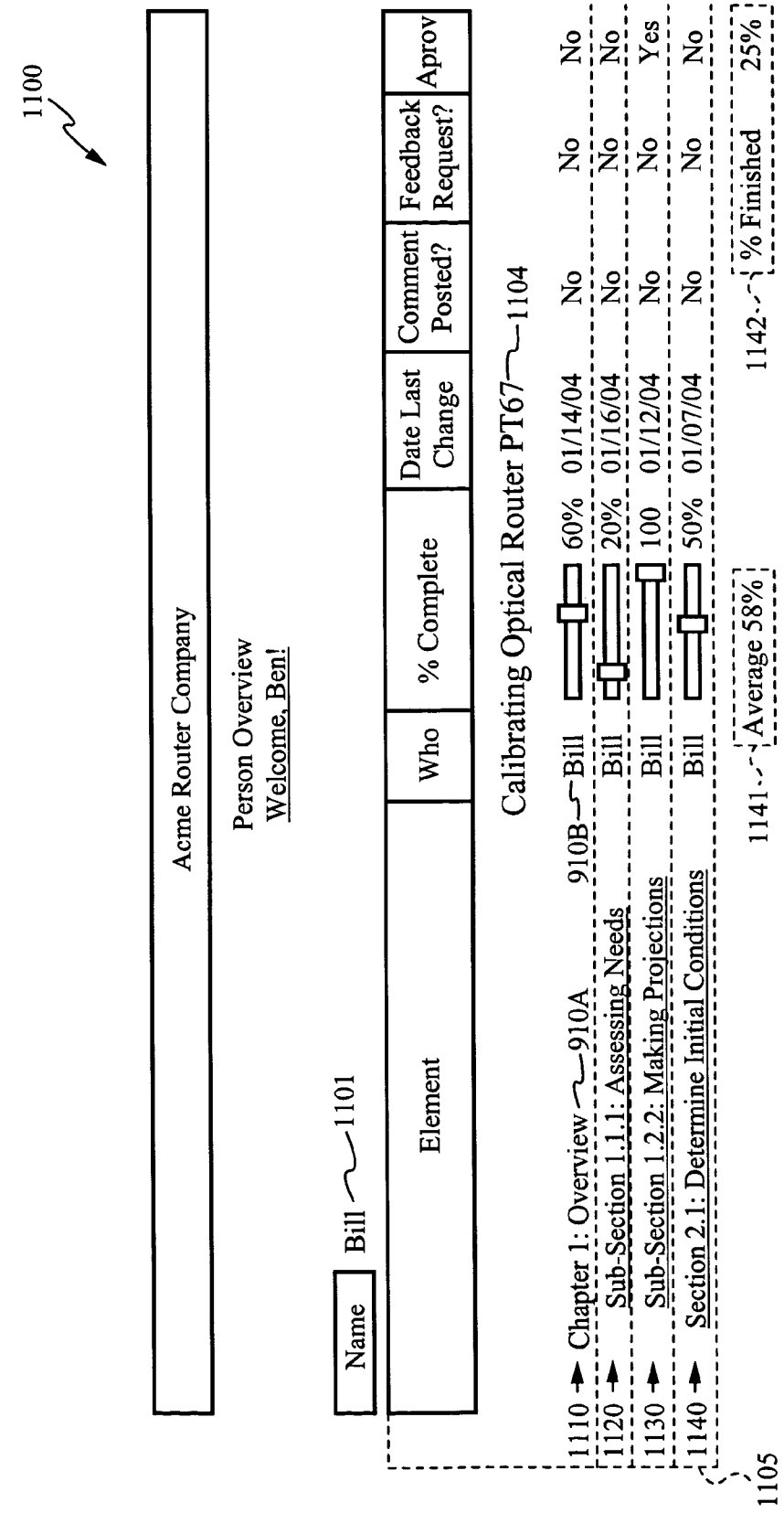
PFD
Rich Text Format
HTML
XML
970D
Publish

Fig. 10


1100
Acme Router Company
Person Overview
Welcome, Ben!
Name
Bill
1101
Element
Who
% Complete
Date Last Change
Comment Posted?
Feedback Request?
Aprov
Calibrating Optical Router PT67
1104
1110 Chapter 1: Overview
910A
910B
Bill
60%
01/14/04
No
No
1120 Sub-Section 1.1.1: Assessing Needs
Bill
20%
01/16/04
No
No
1130 Sub-Section 1.2.2: Making Projections
Bill
100
01/12/04
No
Yes
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Bill
50%
01/07/04
No
No
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1142 % Finished 25%
1105

Fig. 11

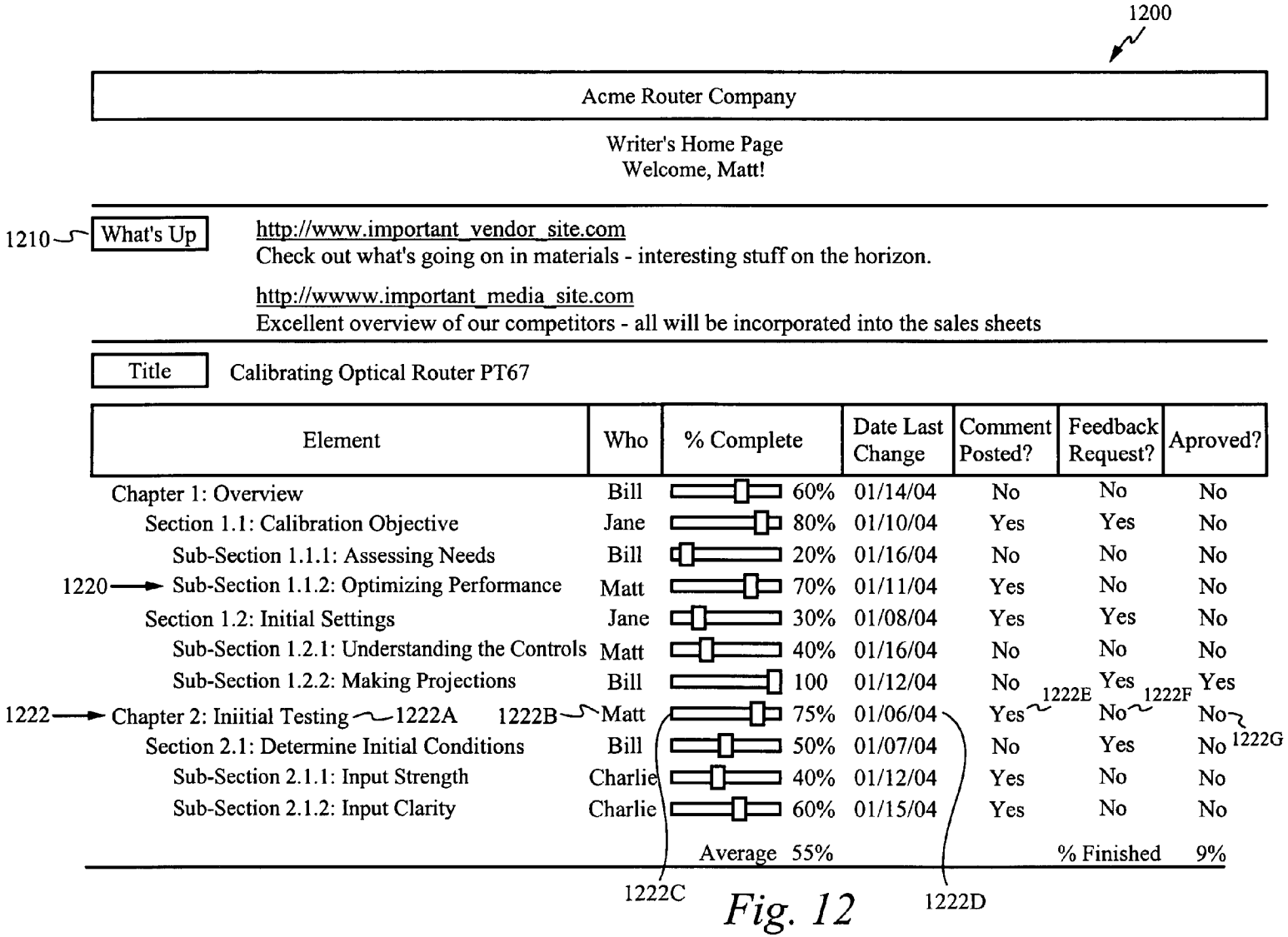
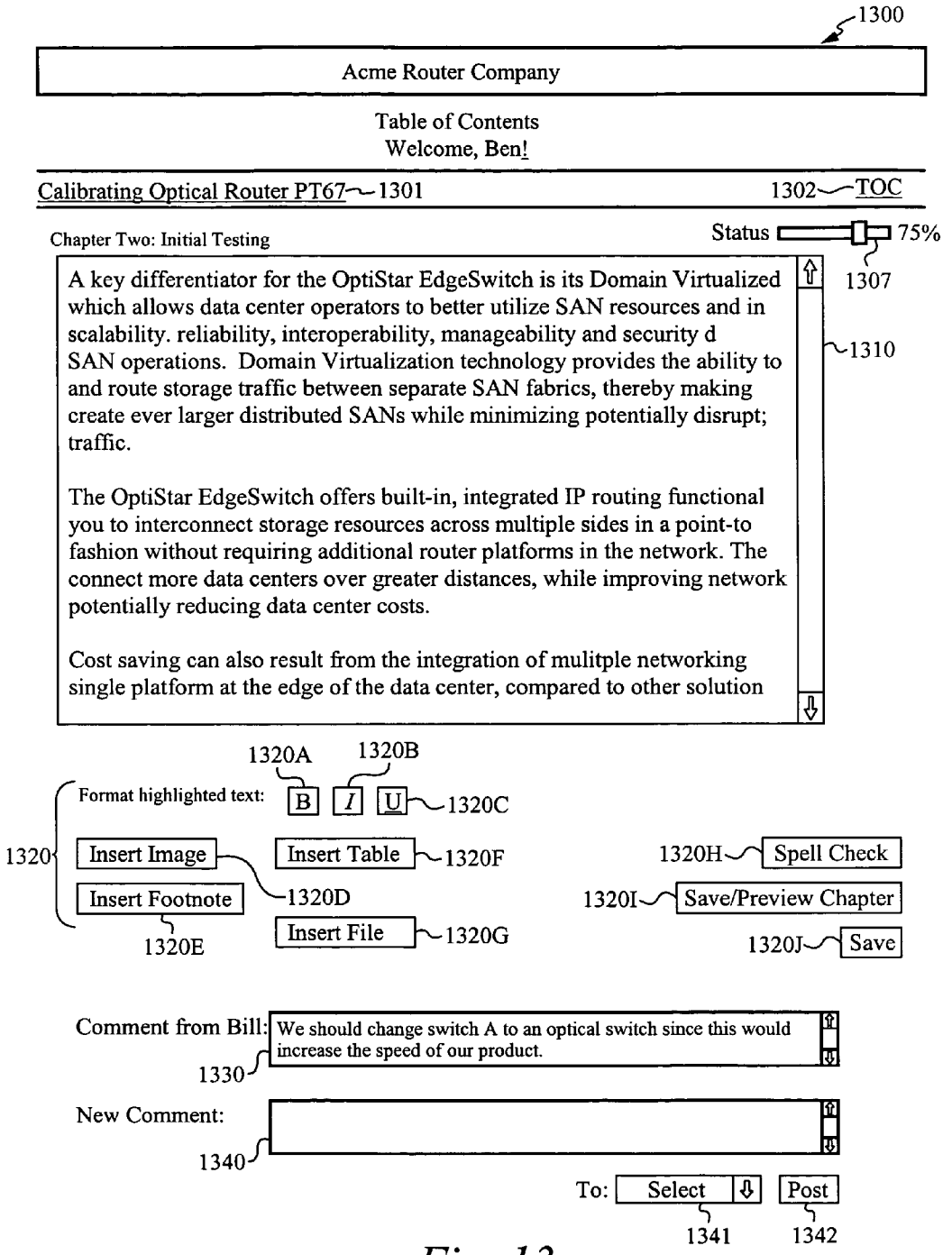

1200
Acme Router Company
Writer's Home Page
Welcome, Matt!
1210
What's Up
http://www.important_vendor_site.com
Check out what's going on in materials - interesting stuff on the horizon.
http://wwww.important_media_site.com
Excellent overview of our competitors - all will be incorporated into the sales sheets
Title
Calibrating Optical Router PT67
Element
Who
% Complete
Date Last Change
Comment Posted?
Feedback Request?
Aproved?
Chapter 1: Overview Bill 60% 01/14/04 No No No
Section 1.1: Calibration Objective Jane 80% 01/10/04 Yes Yes No
Sub-Section 1.1.1: Assessing Needs Bill 20% 01/16/04 No No No
1220
Sub-Section 1.1.2: Optimizing Performance Matt 70% 01/11/04 Yes No No
Section 1.2: Initial Settings Jane 30% 01/08/04 Yes Yes No
Sub-Section 1.2.1: Understanding the Controls Matt 40% 01/16/04 No No No
Sub-Section 1.2.2: Making Projections Bill 100 01/12/04 No Yes Yes
1222
Chapter 2: Iniitial Testing
1222A
1222B
Matt 75% 01/06/04 Yes No No
1222E
1222F
1222G
Section 2.1: Determine Initial Conditions Bill 50% 01/07/04 No Yes No
Sub-Section 2.1.1: Input Strength Charlie 40% 01/12/04 Yes No No
Sub-Section 2.1.2: Input Clarity Charlie 60% 01/15/04 Yes No No
Average 55%
% Finished 9%
1222C
1222D

Fig. 12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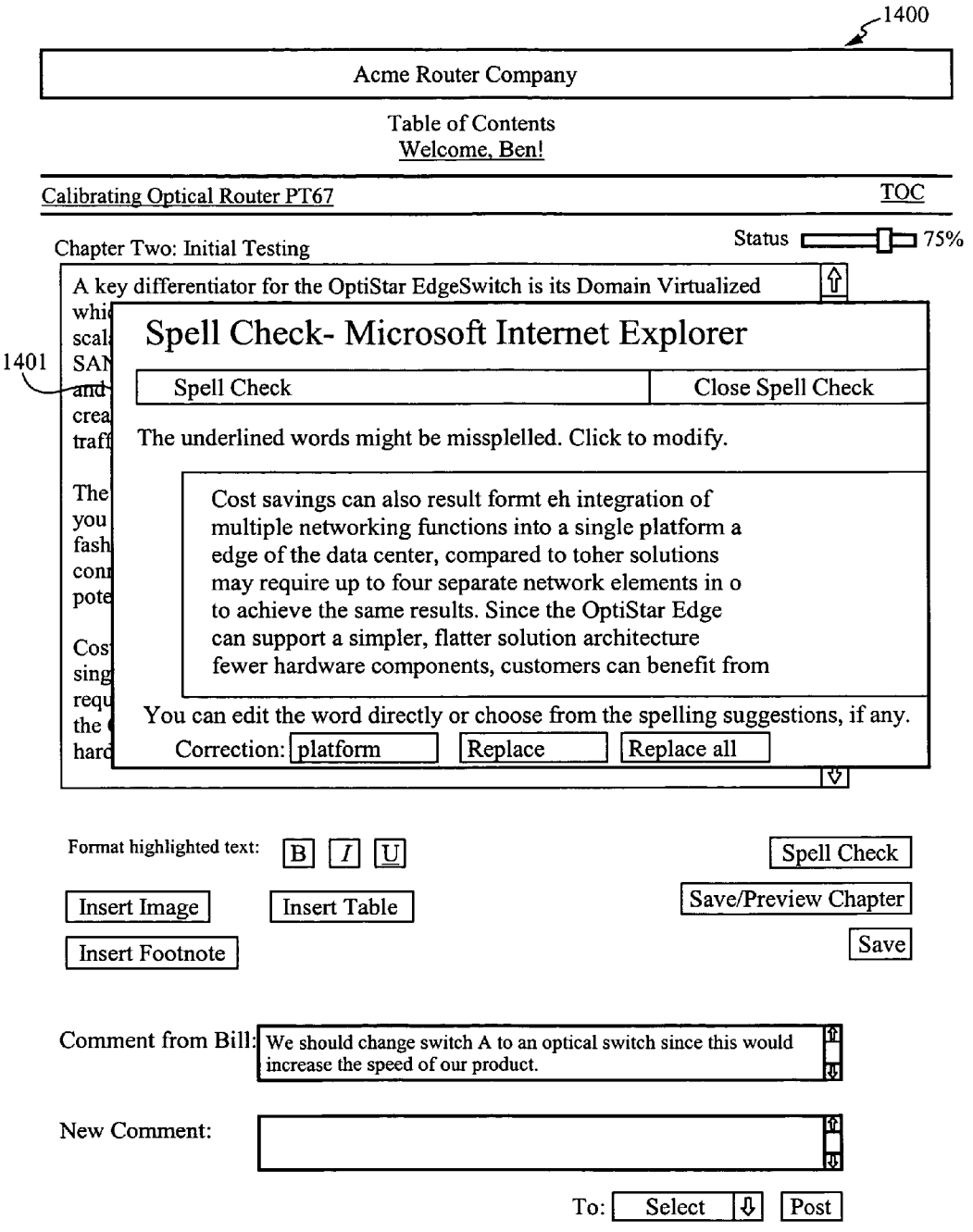
Acme Router Company
Table of Contents
Welcome, Ben!
Calibrating Optical Router PT67
1301
1302
TOC
Chapter Two: Initial Testing
Status
75%
1307
A key differentiator for the OptiStar EdgeSwitch is its Domain Virtualized which allows data center operators to better utilize SAN resources and in scalability. reliability, interoperability, manageability and security d SAN operations. Domain Virtualization technology provides the ability to and route storage traffic between separate SAN fabrics, thereby making create ever larger distributed SANs while minimizing potentially disrupt; traffic.
The OptiStar EdgeSwitch offers built-in, integrated IP routing functional you to interconnect storage resources across multiple sides in a point-to fashion without requiring additional router platforms in the network. The connect more data centers over greater distances, while improving network potentially reducing data center costs.
Cost saving can also result from the integration of mulitple networking single platform at the edge of the data center, compared to other solution
1310
1320A
1320B
Format highlighted text:
B
I
U
1320C
1320
Insert Image
Insert Table
1320F
Insert Footnote
1320D
1320E
Insert File
1320G
1320H
Spell Check
1320I
Save/Preview Chapter
1320J
Save
Comment from Bill:
We should change switch A to an optical switch since this would increase the speed of our product.
1330
New Comment:
1340
To:
Select
Post
1341
1342

Fig. 13


1400
Acme Router Company
Table of Contents
Welcome, Ben!
Calibrating Optical Router PT67
TOC
Chapter Two: Initial Testing
Status
75%
A key differentiator for the OptiStar EdgeSwitch is its Domain Virtualized
1401
Spell Check- Microsoft Internet Explorer
Spell Check
Close Spell Check
The underlined words might be missplelled. Click to modify.
Cost savings can also result formt eh integration of multiple networking functions into a single platform a edge of the data center, compared to toher solutions may require up to four separate network elements in o to achieve the same results. Since the OptiStar Edge can support a simpler, flatter solution architecture fewer hardware components, customers can benefit from
You can edit the word directly or choose from the spelling suggestions, if any.
Correction: platform
Replace
Replace all
Format highlighted text:
B
I
U
Spell Check
Insert Image
Insert Table
Save/Preview Chapter
Insert Footnote
Save
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We should change switch A to an optical switch since this would increase the speed of our product.
New Comment:
To:
Select
Post

Fig. 14

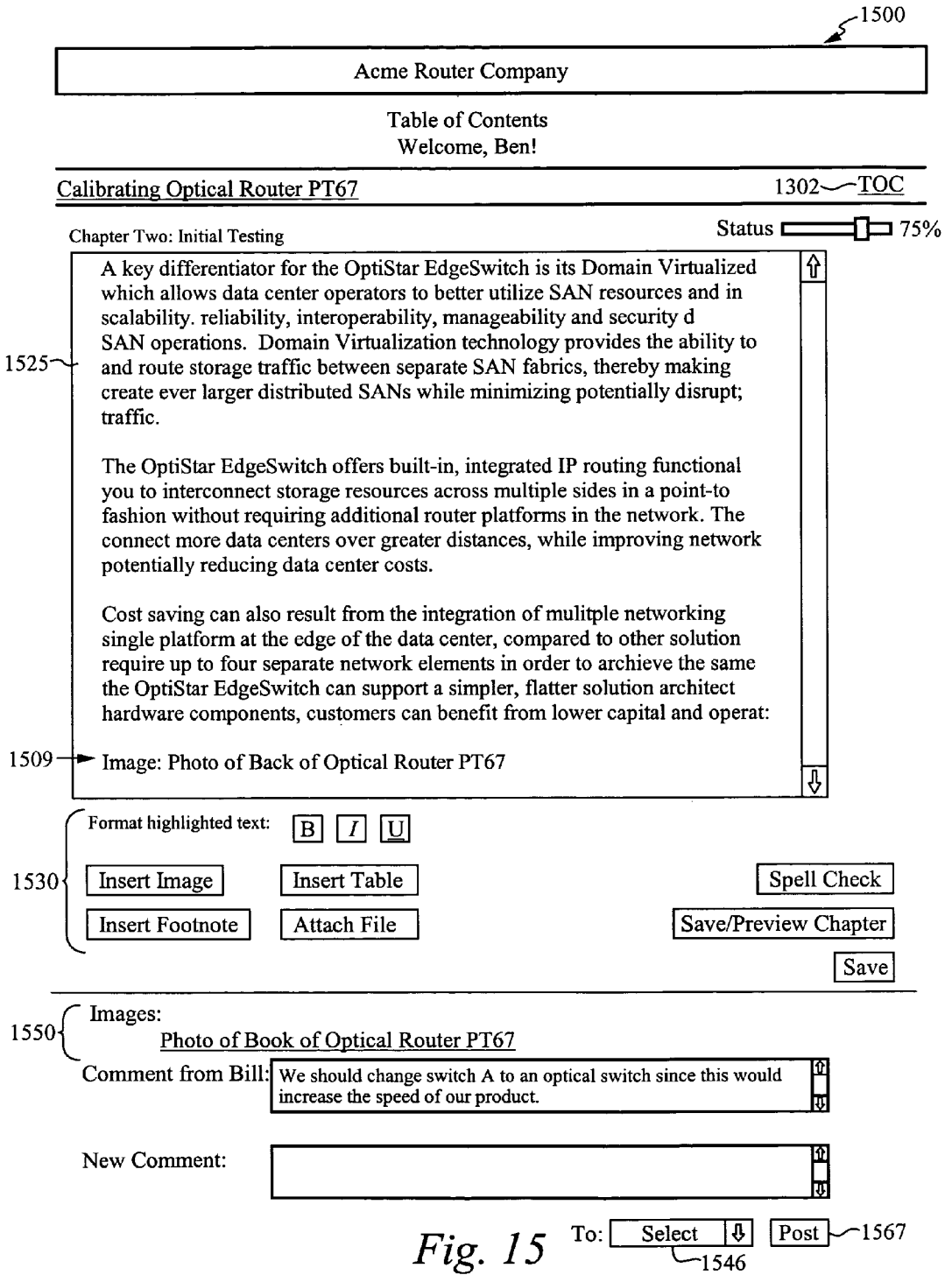
1500
Acme Router Company
Table of Contents
Welcome, Ben!
Calibrating Optical Router PT67
1302
TOC
Chapter Two: Initial Testing
Status
75%
1525
A key differentiator for the OptiStar EdgeSwitch is its Domain Virtualized which allows data center operators to better utilize SAN resources and in scalability. reliability, interoperability, manageability and security d SAN operations. Domain Virtualization technology provides the ability to and route storage traffic between separate SAN fabrics, thereby making create ever larger distributed SANs while minimizing potentially disrupt; traffic.
The OptiStar EdgeSwitch offers built-in, integrated IP routing functional you to interconnect storage resources across multiple sides in a point-to fashion without requiring additional router platforms in the network. The connect more data centers over greater distances, while improving network potentially reducing data center costs.
Cost saving can also result from the integration of mulitple networking single platform at the edge of the data center, compared to other solution require up to four separate network elements in order to archieve the same the OptiStar EdgeSwitch can support a simpler, flatter solution architect hardware components, customers can benefit from lower capital and operat:
1509
Image: Photo of Back of Optical Router PT67
Format highlighted text:
B
I
U
1530
Insert Image
Insert Table
Spell Check
Insert Footnote
Attach File
Save/Preview Chapter
Save
1550
Images:
Photo of Book of Optical Router PT67
Comment from Bill:
We should change switch A to an optical switch since this would increase the speed of our product.
New Comment:
To:
Select
1546
Post
1567

Fig. 15

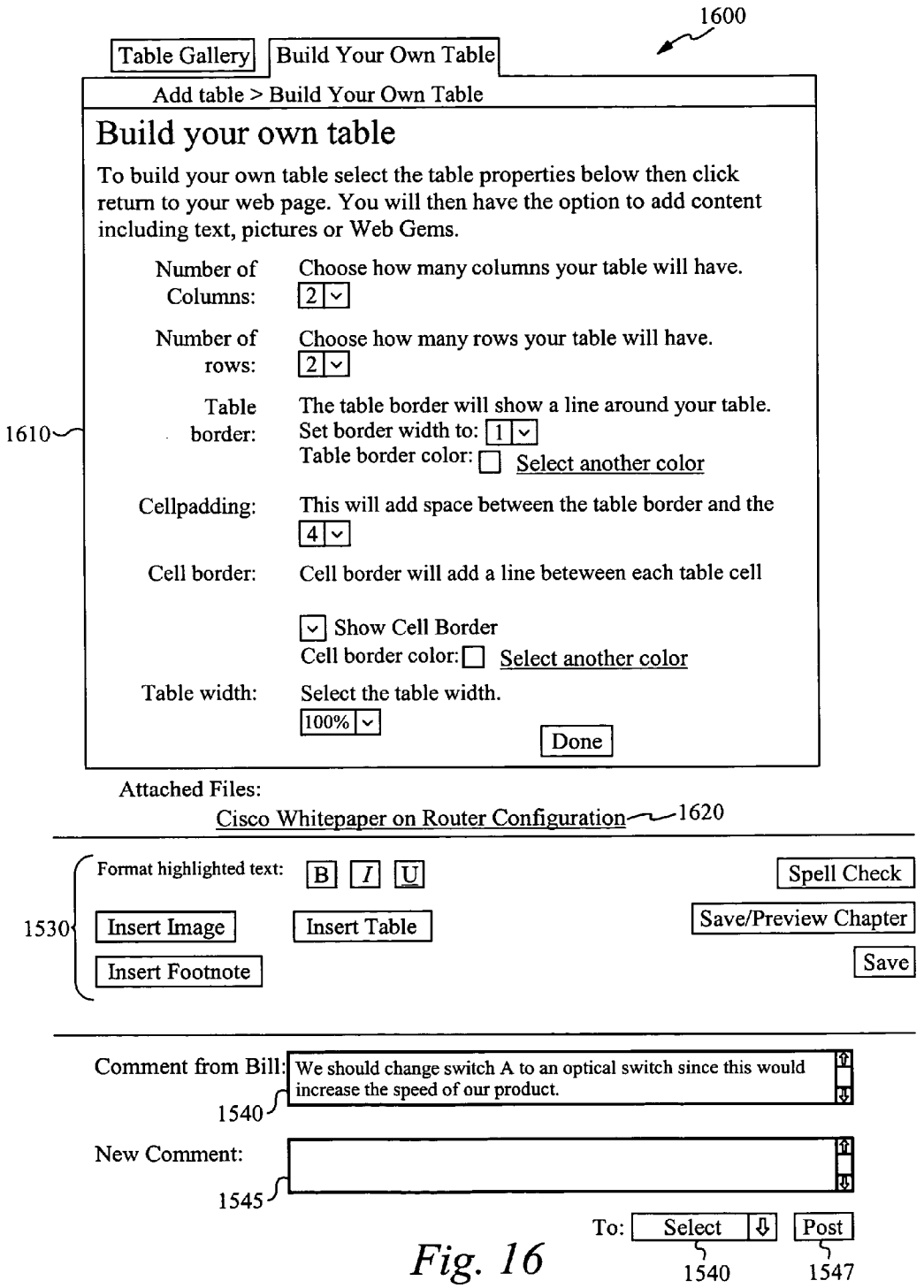
1600
Table Gallery
Build Your Own Table
Add table > Build Your Own Table
Build your own table
To build your own table select the table properties below then click return to your web page. You will then have the option to add content including text, pictures or Web Gems.
Number of Columns:
Choose how many columns your table will have.
2
Number of rows:
Choose how many rows your table will have.
2
1610
Table border:
The table border will show a line around your table.
Set border width to: 1
Table border color: Select another color
Cellpadding:
This will add space between the table border and the
4
Cell border:
Cell border will add a line beteween each table cell
Show Cell Border
Cell border color: Select another color
Table width:
Select the table width.
100%
Done
Attached Files:
Cisco Whitepaper on Router Configuration
1620
1530
Format highlighted text:
B
I
U
Spell Check
Insert Image
Insert Table
Save/Preview Chapter
Insert Footnote
Save
Comment from Bill:
We should change switch A to an optical switch since this would increase the speed of our product.
1540
New Comment:
1545
To:
Select
Post
1540
1547

Fig. 16

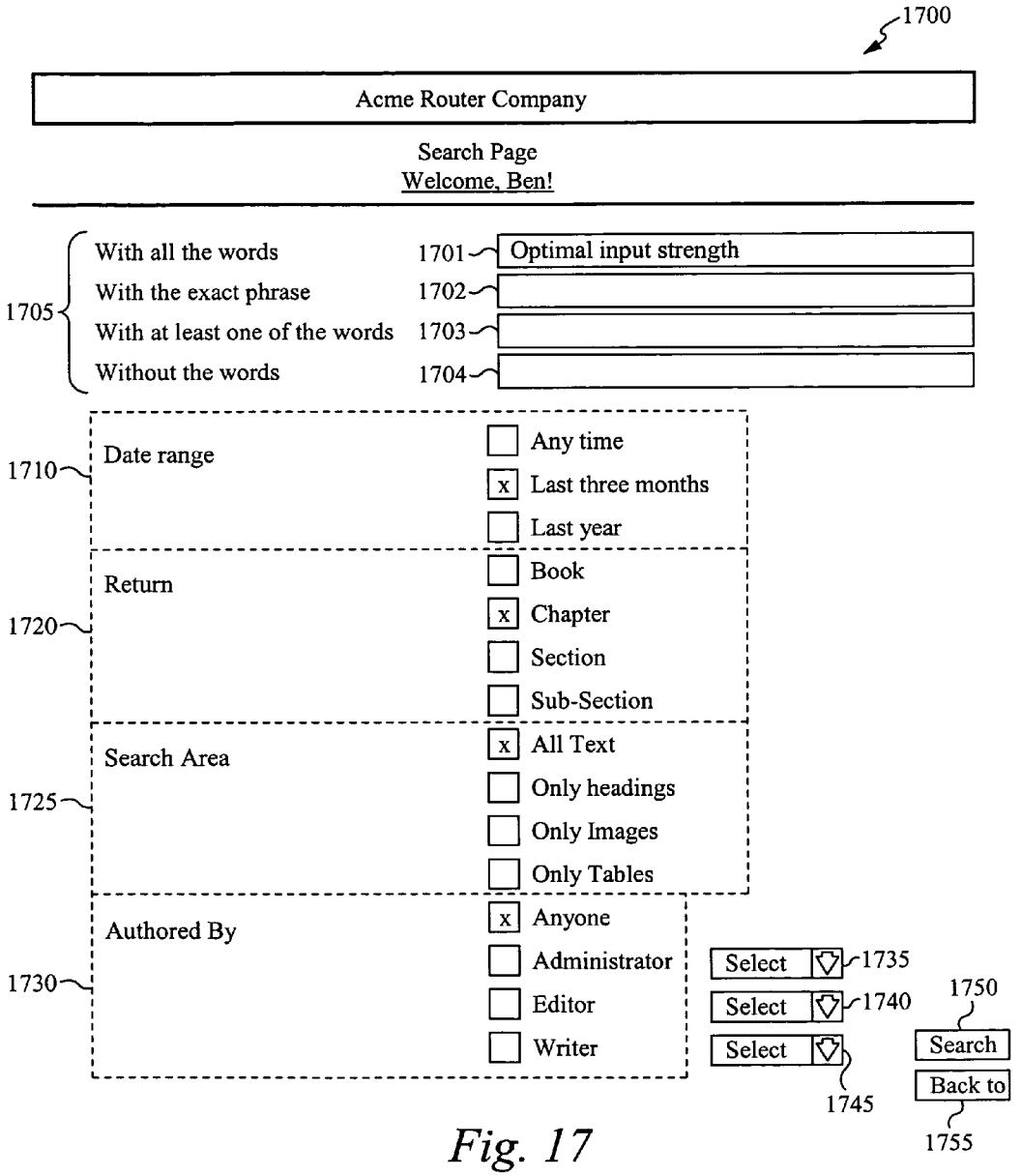
1700
Acme Router Company
Search Page
Welcome, Ben!
1705
With all the words
1701
Optimal input strength
With the exact phrase
1702
With at least one of the words
1703
Without the words
1704
1710
Date range
Any time
x Last three months
Last year
1720
Return
Book
x Chapter
Section
Sub-Section
1725
Search Area
x All Text
Only headings
Only Images
Only Tables
1730
Authored By
x Anyone
Administrator
Editor
Writer
Select
1735
Select
1740
Select
1745
1750
Search
Back to
1755

Fig. 17

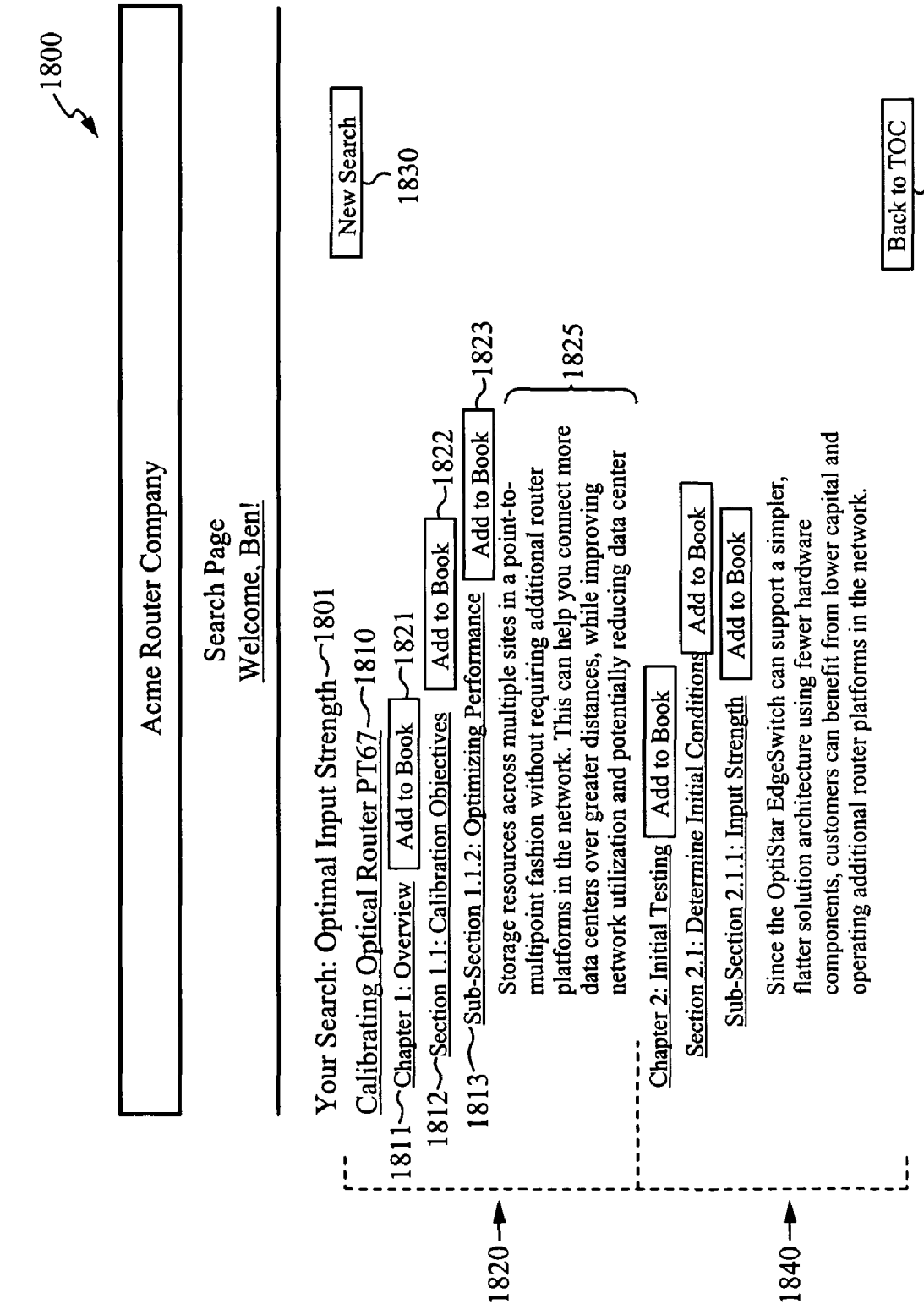
1800
Acme Router Company
Search Page
Welcome, Ben!
Your Search: Optimal Input Strength
1801
Calibrating Optical Router PT67
1810
New Search
1830
1811
Chapter 1: Overview
Add to Book
1821
1812
Section 1.1: Calibration Objectives
Add to Book
1822
1813
Sub-Section 1.1.2: Optimizing Performance
Add to Book
1823
Storage resources across multiple sites in a point-to-multipoint fashion without requiring additional router platforms in the network. This can help you connect more data centers over greater distances, while improving network utilization and potentially reducing data center
1825
Chapter 2: Initial Testing
Add to Book
Section 2.1: Determine Initial Conditions
Add to Book
Sub-Section 2.1.1: Input Strength
Add to Book
Since the OptiStar EdgeSwitch can support a simpler, flatter solution architecture using fewer hardware components, customers can benefit from lower capital and operating additional router platforms in the network.
Back to TOC
1835
1820
1840

Fig. 18

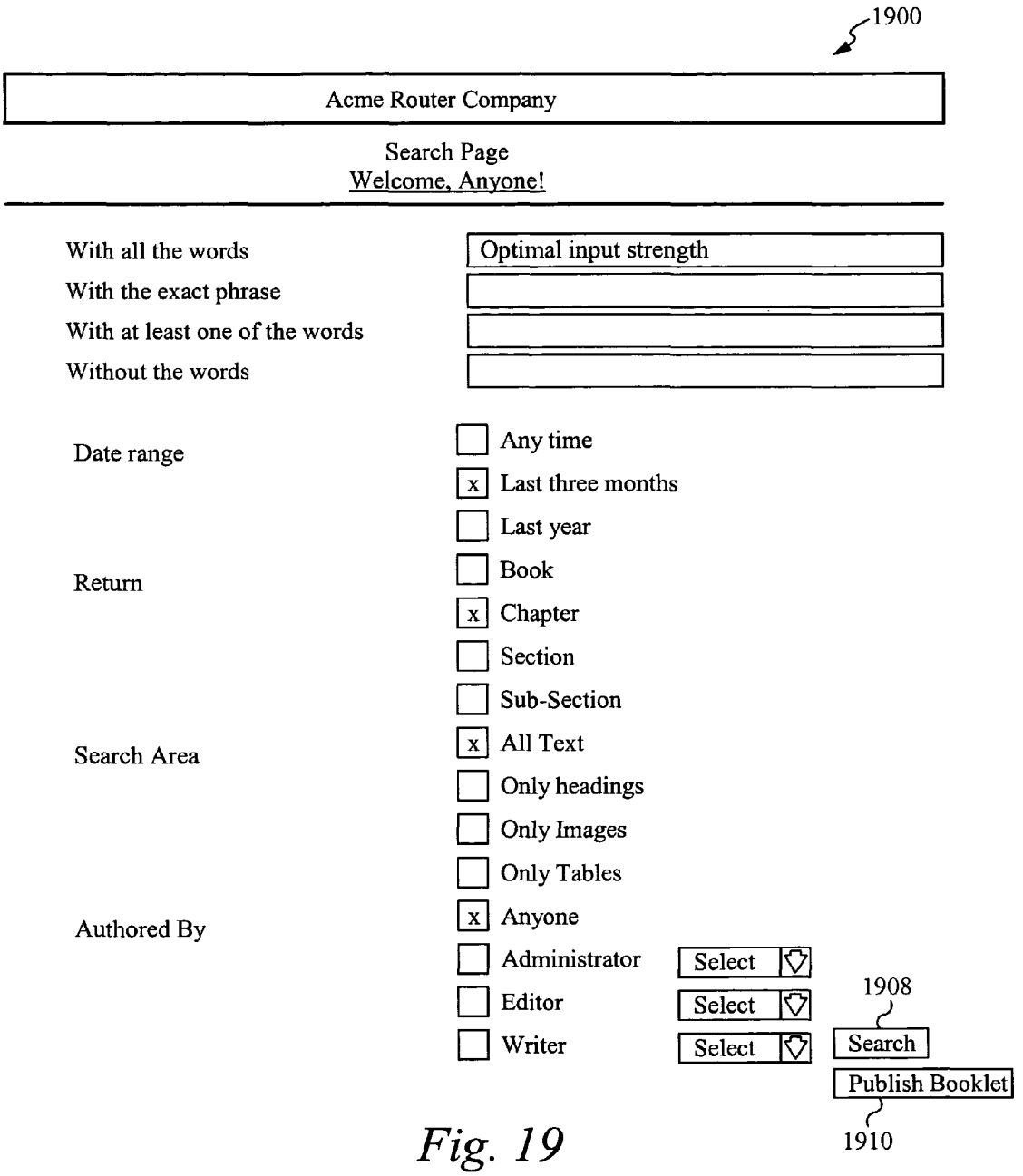
1900
Acme Router Company
Search Page
Welcome, Anyone!
With all the words
Optimal input strength
With the exact phrase
With at least one of the words
Without the words
Date range
Any time
Last three months
Last year
Return
Book
Chapter
Section
Sub-Section
Search Area
All Text
Only headings
Only Images
Only Tables
Authored By
Anyone
Administrator
Select
Editor
Select
Writer
Select
1908
Search
Publish Booklet
1910

Fig. 19

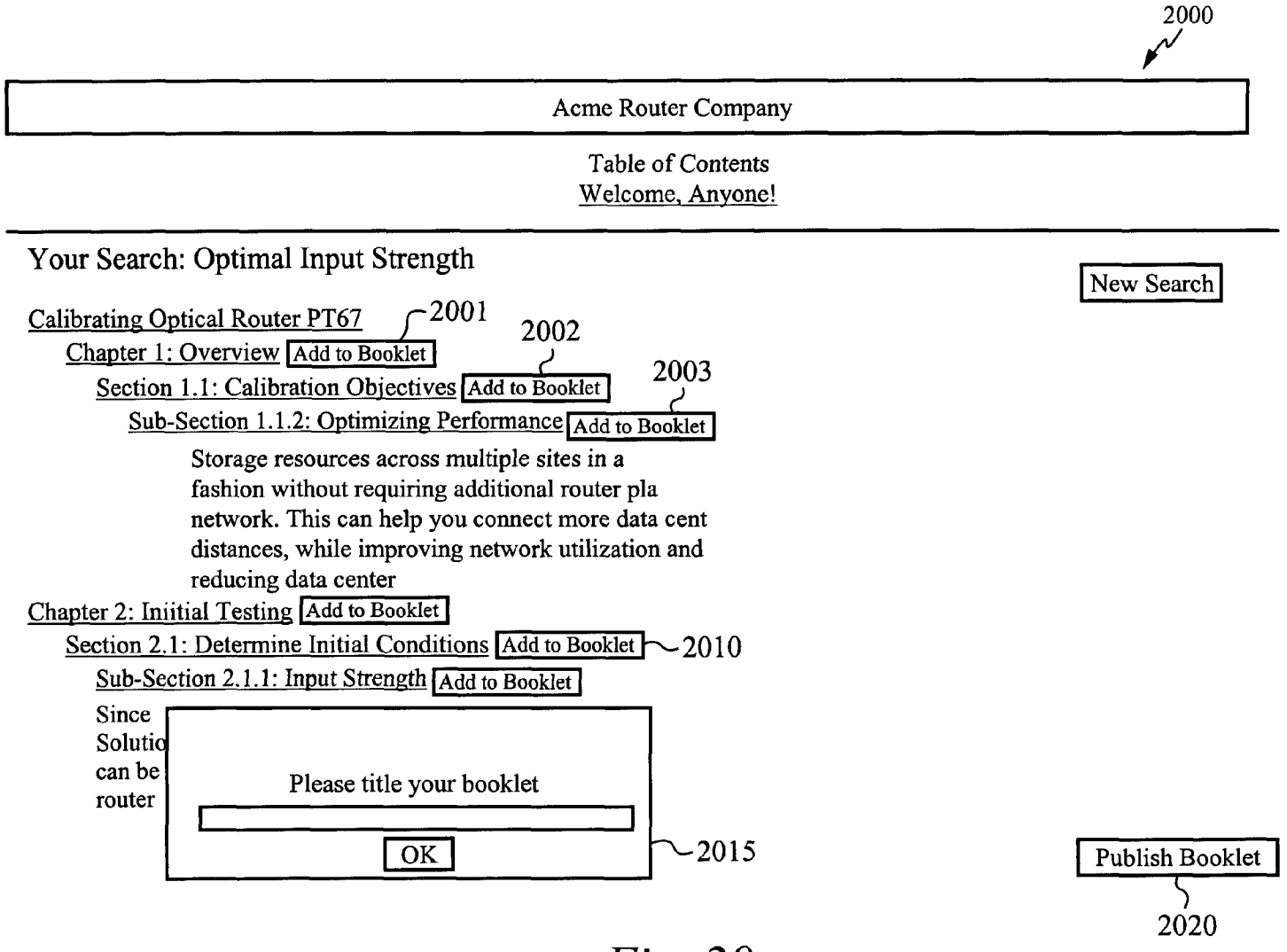
2000
Acme Router Company
Table of Contents
Welcome, Anyone!
Your Search: Optimal Input Strength
New Search
Calibrating Optical Router PT67
2001
Chapter 1: Overview
Add to Booklet
2002
Section 1.1: Calibration Objectives
Add to Booklet
2003
Sub-Section 1.1.2: Optimizing Performance
Add to Booklet
Storage resources across multiple sites in a
fashion without requiring additional router pla
network. This can help you connect more data cent
distances, while improving network utilization and
reducing data center
Chapter 2: Iniitial Testing
Add to Booklet
Section 2.1: Determine Initial Conditions
Add to Booklet
2010
Sub-Section 2.1.1: Input Strength
Add to Booklet
Since
Solutio
can be
router
Please title your booklet
OK
2015
Publish Booklet
2020

Fig. 20

2100

2101	<book>	Calibrating Optical Router PT67
2102	<chapter>	Chapter 1: Overview
2103	<image>	Schematic of router
2104	<section>	Section 1.1: Calibration Objectives
2105	<Sub_Section>	Sub-Section 1.1.1: Assessing Needs
2106	<footnote>	*Good Book About Fiber Optics*
2107	<Sub_Section>	Sub-Section 1.1.2: Optimizing Performance
2108	<section>	Sub-Section 1.2: Initial Settings
2109	<Sub_Section>	Sub-Section 1.2.1: Understanding the Controls
2110	<Sub_Section>	Sub-Section 1.2.2: Making Projections
2111	<Table>	Charateristics of Optic Data
2112	<chapter>	Chapter 2: Initial Testing
2113	<section>	Sub-Section 2.1: Determine Initial Conditions
2114	<sub_section>	Sub-Section 2.1.2: Input Clarity
2115	<images>	Causes of Interference
2116	<footnote>	*Book Containing the Interference Image*
2117	<sub_section>	Sub-Section 2.1.2: Input Strength
2118	<date_published>	
2119	<administrator>	
2120	<editor>	
2121	<writer>	
2122	<writer>	
2123	<writer>	

Table 1

Fig. 21

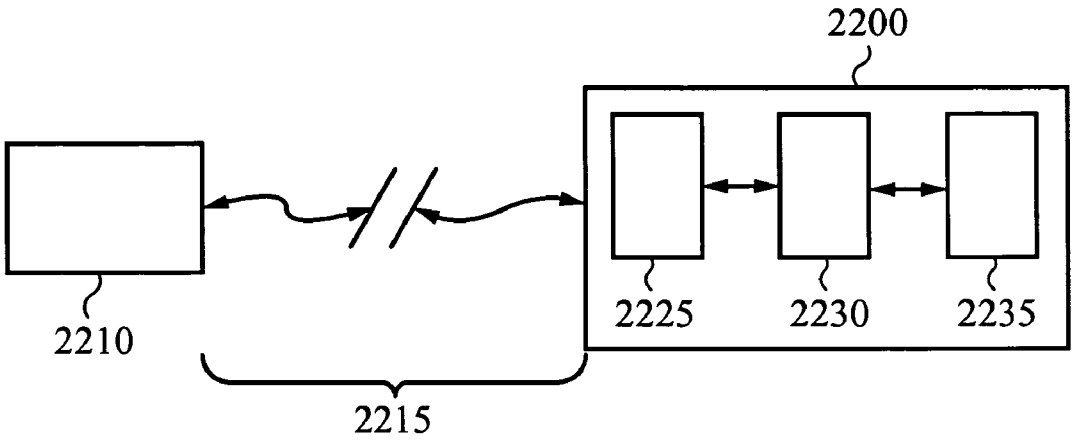

Fig. 22

METHOD OF AND SYSTEM FOR COLLABORATION WEB-BASED PUBLISHING

FIELD OF THE INVENTION

This invention relates to electronic documents. More particularly, this invention relates to electronic documents having a single interface that allows a user to modify, track, publish, search through, and import content into the electronic documents.

BACKGROUND OF THE INVENTION

Many projects, given their size and complexity, require the collaboration of many individuals. A product installation manual, for example, has many sections, each having detailed specifications for the product. Each section may be edited by one or more individuals knowledgeable in the material contained in the section. Coordinating and tracking work on the documents is generally referred to as "product work flow."

In one prior art system, company employees can check-out a document to work on it and then check it back in when done. The system tracks the changes everyone makes, a method called versioning. The system sends e-mail alerts to let others know of the changes. The system may also include a separate message board where employees can talk about the document. When the document is finished, it may be locked by an administrator and made available for searches on the company's intranet.

This prior art system integrates Microsoft Outlook™, Microsoft Word™, a server-based document repository, a server-based full-text search engine, a message board, and some type of project management or workflow application. The system may also include reporting tools that will read through the communications and present the administrator with various statistics.

This system has several drawbacks. First, information is contained in Word documents. Search queries among a number of documents tell users which documents contain the search terms, but the queries do not tell the user where in the document the search terms are found. The user must still look through each document to determine where the search terms are located. Second the documents are not easily accessible to multiple users, especially those at remote locations such as customer sites. Third, the documents cannot be easily or quickly edited and reformatted for display.

SUMMARY OF THE INVENTION

Embodiments of the present invention include a method of and a system for generating, organizing, editing, and searching through an electronic document. The embodiments provide a Web-based graphical user interface to the document, allowing users from remote locations to quickly and easily access the document. The embodiments also provide an easy way to assign sections of the document for users to work on, and a way to track the progress on those sections. The embodiments allow the document to be published in a variety of formats.

In accordance with a first aspect of the present invention, a system comprises a document control module comprising a document engine and a document portion; a workflow control module for tracking and assigning work on the document portion; and a Web-based interface coupled to the document control module and the workflow control module. The workflow control module provides a plurality of sets of functions

to be performed on the document portion, each set of functions corresponding to a type of user. Preferably, a first type of user has a corresponding first set of functions, the first set of functions comprising adding a user to the system, adding a book to the system, and assigning work to a user. A second type of user has a corresponding second set of functions, the second set of functions comprising assigning work to a user, creating a chapter in a book, and creating sections in the chapter. A third type of user has a corresponding third set of functions, the third set of functions comprising editing a section of the book and reporting a completion status for work on the section of the book.

Preferably, the workflow control module comprises a plurality of panels, each panel associated with a workflow for one or more sections of the document portion. A first panel from the plurality of panels contains an identifier corresponding to the location of a second panel from the plurality of panels.

In other embodiments, the identifier comprises a link to the second panel. Preferably, the first panel comprises a first Web page, the second panel comprises a second Web page, and the link comprises a uniform resource locator for the second Web page. In another embodiment, the document portion comprises markers corresponding to headings within the document portion. The markers comprise Standard Generalized Markup Language (SGML) tags, such as eXtensible Markup Language (XML) or Hypertext Markup Language (HTML) tags. Alternatively, the markers are Rich Text Format (RTF) control words. The document control engine comprises a formatting engine configured to automatically embed the markers within the document portion in response to an input from the Web-based interface.

In other embodiments, the system further comprises a host coupled to the Web-based interface. A Web browser executes on the host. The host is coupled to the Web-based interface over a local area network or over a wide area network such as the Internet. Alternatively, the host is coupled to the Web-based interface over a secure channel such as a virtual private network.

In other embodiments, the document control engine is configured to import an object into the document portion in response to a command received on the Web-based interface. The object is one of a sound file, an image file, a table, and a video clip.

In other embodiments, the workflow control module comprises a Library area containing a book identifier, a corresponding status display, and a corresponding due date. The workflow control module also comprises a Book Overview panel containing a plurality of entries, each entry having a title area, an owner area, and a status area. The status area contains a completion percentage area. The document control module comprises a publishing engine configured to publish the document portion in a selected format. The selected format is one of Portable Document Format (PDF), Rich Text Format, HTML, and XML.

In other embodiments, one of the plurality of panels comprises a comment field. The document control engine further comprises a search engine configured to search within the document portion for a target using search criteria. The search criteria comprises at least one of a date range, a search term, a search area, a user type, and a user identity. The user type is one of an administrator, an editor, and a writer. Preferably, the search engine is configured to display a location within the document portion where the search term is found. The search engine is configured to display markers and text corresponding to the location of search terms within the document portion. The markers correspond to headings within the document portion.

In other embodiments, the headings correspond to at least one of a book heading, a chapter heading, a section heading, and a sub-section heading of a book. The search area is one of text, a heading, an image, and a table. The document control module is configured to import the result of one or more searches directly into the document portion. The Web-based interface is configured to allow both a primary user and a secondary user to access the search engine. The system is configured to collect one or more results of searches into a booklet, to format the booklet, and to transmit the formatted booklet to a host computer. Preferably, the booklet is formatted as a PDF file.

In accordance with a second aspect of the present invention, a system comprises a document control module comprising a document engine and a document portion; a workflow control module for tracking and assigning work on the document portion, the workflow control module comprising a communications module for communication workflow information; a Web-based interface coupled to the document control module and the workflow control module; and a host coupled to the Web-based interface over a network.

In accordance with a third aspect of the invention, a method of controlling workflow related to a document comprises accessing the document using a Web-based interface and using the Web-based interface to perform one of tracking a status relating to a completion of a section of the document, updating the status, and editing the document.

In accordance with a fourth aspect of the invention, a graphical user interface comprises a first panel displaying headings, work assignments, and status of sections of a document; a second panel coupled to the first panel, the second panel containing a link to a section of the document; and a third panel for displaying the section of the document, the third panel configured for editing the section of the document. The first panel, the second panel, and the third panel are all accessible to a host over a Web-based interface.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a user log-in screen in accordance with one embodiment of the present invention.

FIG. **2** is a screen shot of an Administrator's Home page in accordance with one embodiment of the present invention.

FIG. **3** is a screen shot of an Administrator's Home page in accordance with one embodiment of the present invention.

FIG. **4** is a screen shot of the Administrator's Home page of FIG. **3**, with additional editors and writers added, in accordance with one embodiment of the present invention.

FIG. **5** is a screen shot of the Administrator Home page of FIG. **2**, with additional book titles, in accordance with one embodiment of the present invention.

FIG. **6** is a screen shot of a calendar for the completion of a book in accordance with one embodiment of the present invention.

FIG. **7** is a screen shot of a Table of Contents for a book in accordance with one embodiment of the present invention.

FIG. **8** is a screen shot of the Table of Contents shown in FIG. **7** with additional sections added to titles in accordance with one embodiment of the present invention.

FIG. **9** is a screen shot of a Book Overview page in accordance with one embodiment of the present invention.

FIG. **10** is a screen shot of the Book Overview page of FIG. **9**, including a pop-up window allowing the user to save a copy of the current book with a different title, commonly referred to as a "Save As" function, in accordance with one embodiment of the present invention.

FIG. **11** is a screen shot of a Person Overview page in accordance with one embodiment of the present invention.

FIG. **12** is a screen shot of a Writer's Home page in accordance with one embodiment of the present invention.

FIG. **13** is a screen shot of a Writing page in accordance with one embodiment of the present invention.

FIG. **14** is a screen shot of the Writing page shown in FIG. **13**, with a pop-up window for a spell checker in accordance with one embodiment of the present invention.

FIG. **15** is a screen shot of the Writing page shown in FIG. **13**, with an embedded image in accordance with one embodiment of the present invention.

FIG. **16** is a screen shot of the Writing page shown in FIG. **13**, with a pop-up of a Table Creation interface, in accordance with one embodiment of the present invention.

FIG. **17** is a screen shot of a Search page in accordance with one embodiment of the present invention.

FIG. **18** is a screen shot of the result of running a search query, having the search criteria shown in FIG. **17**, and showing the buttons that the user can use to import search results into an existing or new book, in accordance with one embodiment of the present invention.

FIG. **19** is a screen shot of a Search page from which a secondary user searches within documents in a system library.

FIG. **20** is a screen shot of a results page from which a secondary user can generate a booklet, a collection of search results.

FIG. **21** contains a table containing XML tags used to store documents in accordance with one embodiment of the present invention.

FIG. **22** is a block diagram of a system in accordance with the present invention.

DETAILED DESCRIPTION OF THE INVENTION

The present invention allows users to more efficiently collaborate on documents, producing documents that are more accurate, more easily updated, and more accessible. For example, in accordance with the present invention, company field engineers are able to quickly view product service manuals from customer sites. Using a single interface, the field engineers are able to access the service manuals; they are able to quickly search through the manuals for key terms, helping them to quickly troubleshoot malfunctioning products; they are able to exchange messages about the manual; they are able to update the manual to reflect product information discovered in the field; and they are able to generate new service manuals, specifically tailored to a particular customer product. These and other advantages are achieved by the embodiments of the present invention.

As used below, manuals and other documents generated in accordance with the present invention are referred to as "books." As used herein "books" refers to electronic documents of many types, such as electronic manuals, electronic research papers, and the like. "Book" refers to any document that includes but is not limited to text, images, workflow and tracking statistics, and other data about the book. The book also optionally contains formatting tags including but not limited to Hyper Text Markup Language (HTML) tags, Extensible Markup Language (XML) tags, other meta tags, as well as words used for formatting such as those embedded with rich text format (RTF) documents. It will be appreciated that books can be of any length and complexity. For example, a book can be a single-page text document, such as a paper describing one feature of a product. Alternatively, a book can be a thousand-page document describing a product in detail

and containing XML tags marking section headings, such as chapter headings, paragraph headings, and footnotes. Preferably, the book is stored in discrete parts in location as an XML file or in a structured query language (SQL) database.

A system in accordance with one embodiment of the present invention allows users to log on to the system using a Web based interface to access one or more books. The system also allows users to write sections of the books, organize sections of the books, track the progress of persons working (editing) sections of the books, set completion due dates for sections of the books, assign the editing of sections to people within an organization, add to the book links to Web sites that users may be interested in, exchange comments about sections of the books, search within the books, embed objects within the books, including but not limited to text files, still images, moving video clips, tables, footnotes, and the results of searches. The system also allows users to publish portions of the books, exporting text, images, tables, and footnotes. Books can be published in a variety of formats to fit the situation at hand. For example, a user may wish to publish a PDF version of the book for easy printing. Alternatively, a user may wish to publish an HTML version of a book for display on a Web site.

In accordance with one embodiment of the present invention, the system allows various types of users with various privileges. For example, an Administrator oversees the system and accordingly has the most extensive privileges. Among other privileges, the Administrator has the ability to add a new book to the system, assign an Editor to a book, input new chapters and sections to a book, make books searchable, check the work progress for specific individuals, and add links to information of specific interest to individuals working on a project. An Editor has fewer privileges than an Administrator. And a Writer has even fewer privileges, being able only to view sections of the book that he is working on. As used herein, the term "user" is used to refer to Administrators, Editors, and Writers.

FIG. **1** shows a graphical user interface (GUI) log-in screen **100**, having a user name input field **105**, a password input field **110**, and a reminder link **115** that takes the user to a Help Web page (not shown) that helps him remember his password. A user logging in from a customer site would reach the log-in screen after loading the Web page on a host at the customer site. The Help Web page may contain a hint, it may e-mail the password to a secure account where the user can read it, or it may provide other means to help the user log on. In a preferred embodiment, the user's identity will determine what functions he is able to perform on documents and other files within the system. It will be appreciated that if the user's login information does not match an entry in the login database, the user will not be allowed access to the system.

Preferably, the log-in screen is a Web page that the user accesses from a remote location, such as over a wide area network coupling a host at a customer site with a host on which the system of the present invention executes. Preferably, the remote host executes a Web client that allows the user to communicate with a Web-server that forms part of the system. It will be appreciated that in other embodiments the system runs on multiple hosts comprising a Web server and a back-end database containing books, a login database, other programs and data, or any combination of these. Preferably, the back-end database or another back-end database also stores a list of users allowed access to the system, their passwords, their status (Administrator, Editor, or Writer). It will be appreciated that other configurations can be used in accordance with the present invention. Preferably the wide area network comprises a secure channel such as a virtual private network (VPN) on the Internet. It will be appreciated that other channels can be used, such as non-secure Internet connections, local area networks, wireless networks, or any other connection. Preferably, the system is configured to couple with the host over connections automatically established by handshaking protocols or by parameters set within the system or the remote host.

It will also be appreciated that information such as log in screens can be presented to a user using panels other than Web pages. As used herein, a panel is a frame of data presented to a user on an electronic display using any one of a variety of formats. Thus, for example, in one embodiment a panel is a Web page displaying a user screen such as a login screen.

In the preferred embodiment, after an Administrator has successfully logged on, he is brought to the Administrator Home Page **200**, shown in FIG. **2**. The Administrator Home Page **200** contains (a) a New Book area **205** having a Title field **206** and an associated Add button **207**, (b) an Add or Name Users area **210** having a Go button **211**, (c) an Add "What's Up" Link area **215** having a Link field **220**, a Comment field **221** with an associated Up arrow **222** and a Down arrow **223**, and an Add button **224**, (d) a Current "What's Up" Links area **225** having a Link field **226** and a Delete button **227**, (e) a Library area **230** having a first entry **231**, the first entry **231** having a Title field **232**, an Editor field **233**, a Status bar **234**, a Due Date field **235**, and a corresponding Delete button **236**, and (f) a People area **240** having a first entry **241**, the first entry **241** having a Name field **242**, a Rank field **243**, and an Average Status bar **244**. Each of these areas is discussed in more detail below.

It will be appreciated that other users of the system, Editors and Writers, will be brought to a screen different from that shown in FIG. **2**. The screen shown Editors and Writers will display only those functions for which the Editors and Writers have privileges. For example, a screen displayed to a Writer who has just logged on will not allow the Writer to add users as provided by the Go button **211** in the Add or Name Users area **210**.

As used herein, a Web page refers to any document that can be displayed by a Web browser. In accordance with embodiments of the present invention, a Web page includes but is not limited to (1) a static document, generated once so that a copy of it is transmitted to a client that accesses it, (2) a dynamic document, generated by an application program running on the Web server when a Web browser requests the document, or (3) an active document, generated by an application program running on a client host. It will be appreciated that the contents of dynamic and active documents are determined by any number of criteria including, but not limited to, the identity of the user requesting the document, the parameters sent as part of the request, and the time of day. Thus, as described in more detail in some of the examples below, when a user accesses a portion of a book, the book's table of contents is automatically generated and displayed to the user. The table of contents constantly changes throughout the document generation process, as chapters are added and deleted, and other sections of the book are updated. The table of contents thus cannot be stored as a static document. Preferably, Web pages, such as tables of contents, are generated at a central location such as a Web server. It will be appreciated, however, that in accordance with the present invention Web pages can be generated on client hosts (e.g., remote locations from which a field engineer is working) or at other locations.

As used herein, the term "identifier" refers to any means for identifying an object, such as a user, a book title, or an interesting article. Similarly, "heading" refers to an identifier for a book, chapter, section, and subsection. In one embodiment, a

heading is a title. Preferably, an identifier refers to a URL for a particular object. For example, a user identifier refers to a URL link to a user's home Web page. In the drawings for this specification, underlined elements denote URL links. Thus, the user identifier Bill refers to a URL for a Web page. When a page is displayed using a Web browser and a user selects the element Bill, the URL contained in the link Bill will be automatically loaded and the corresponding Web page generated, if necessary, and displayed. Web pages can also contain embedded references to other Web pages. As used herein, an element can be "selected" by navigating a cursor over the element and then clicking on a mouse button. Alternatively, an element can be selected by touching it such as when it is displayed on a touch-sensitive screen. It will be appreciated that elements can be selected in other ways.

In operation, an Administrator is able to activate the Title field **206** and enter the title of a new book. When the Administrator enters the title and selects the Add button **207**, a new book with the title is automatically created. It will be appreciated that any field such as the Title field **206** is activated by positioning a cursor within the field and selecting the field such as by clicking the button on a mouse.

Still referring to FIG. **2**, after the Administrator has entered a title in the Title Field **206** and clicked on the Add button **207**, he can scroll to any other field within the Administrator Home Page **200**. Preferably, if the Administrator wishes to add the names of users already in the system or to add the names of new users, he presses the Go button **211**, which brings the user to the Add User Page **300** shown in FIG. **3** and discussed below. The Administrator may do this to allow the new users to access the system. The Administrator then has the ability to assign work and grant other privileges to these new users. If the Administrator wishes to add a User Resource Location (URL) link that visitors to the book may find interesting, he activates that Link field **220** and inputs a URL. In addition, the Administrator can also input a comment into the Comment field **221**, for example, explaining what can be found at the Web page addressed by the URL in the Link field **220**. The Administrator can scroll up or down within the Comment field **221** by using the Up arrow button **222** or the down arrow button **223**, respectively. After editing the URL in the Link field **221**, the comments in the Comment field **222**, or both, the user is able to add both to the book by selecting the Add button **224**.

The Administrator can also view current links in the Current "What's Up" Links area **225**. These links will appear at the top of the Writers' home pages and contain links to resources on the Internet or Intranet that a manger wants everyone to read. An Administrator or Editor can highlight a link in the Link sub-field **226** (none are shown here) and then delete it by selecting the Delete button **227**. When a user clicks on the Add button **224**, the page reloads and the What's Up link appears in the Current "What's Up" Links area **225**. When a user selects the delete button **227**, the page reloads without the What's Up link on it anymore.

Within the Library area **230**, the user is able to view the status of the book having the title in the Title field **232**, the editor whose name appears in the Editor field **233**, the status in the Status bar **234**, and the due date in the Due Date sub-field **235**. The user is able to delete this book from the library by selecting the Delete button **236**. As described in more detail below, the Library area **230** contains a list of books in the system and status for each book.

Finally, the user is able to view the progress of each person working on the book. As one example, using the fields shown in FIG. **2**, the user with the name Bill Smith in the Name field **242**, has the rank **12**, as would be shown in the Rank field **243**, an average status of 15%, as would be shown by the Average Status bar **234**.

It will be appreciated that while FIG. **2** has described a user sequentially accessing the areas, New Book area **205**, Add or Name Users area **210**, Add "What's Up" link area **215**, Current "What's Up" Links area **225**, Library area **230**, and People area **240**, a user is able to access any number of fields or areas in any order.

FIG. **3** shows an Add or Name Users page **300**, in accordance with one embodiment of the present invention, which the user is taken to when he selects Go button **211** of FIG. **2**. The Add or Name Users page **300** contains a User Home link **305**, a User Summary Section **310**, a Name New User section **340**, and an Existing Users section **350**. The Home link **305** is a URL that when selected takes a user back to his Home page. Preferably, each user has a Home page with a format dependent on the user type. For example, in one embodiment, an Administrator's Home page lists the projects within the system and the status of each; a Writer's Home lists the projects he is currently working on and the status for each.

The User Summary Section **310** has (1) a first line **315** displaying the Pool of Administrators (here, 2) and the number of available Administrators in the Pool (here, 1), (2) a second line **320** displaying the Pool of Editors **331** (here, 5) and the number of available Editors (here, 5), (3) a third line **325** displaying the Pool of Writers (here, 30) and the number of available Writers (here, 30), and (4) a Purchase Additional Users button **330**, which when selected allows additional users. Dashed lines in the User Summary Section **310** and throughout the following explanations are shown for readability and generally are not displayed in the User Summary Section **310**. In a preferred embodiment, the system is configured to support a predetermined number of administrators, editors, and writers. If a company licensing the system desires more, it is charged an amount related to the type of additional users requested.

In the Name New User section **340**, a User Type field **349** contains check boxes next to each type of user. The User Type field **349** contains a check box **341** associated with an Administrator, a check box **342** associated with an Editor, and a check box **343** associated with a writer. The Name New User area **340** also contains a Name field **345**, a Password Field **346**, and a Confirm Password Field **347**. For the example shown in FIG. **3**, the check box **342** has been checked, indicating that the new user is an editor. The user has the name "Bill", entered into the Name field **345**. A password is entered into the Password field **346** and reentered, to confirm the password, into the Confirm Password field **347**. As shown in FIG. **3**, for security, the password preferably is not echoed when typed into either the Password field **346** or the Confirm Password field **347**. After a user has checked one of the check boxes **341**, **342**, and **343**, and input the name and password into the Name field **344**, the Password field **346**, and the Confirm Password field **347**, the user selects the Add button **348** to add the new user to the system.

The Existing Users area **350** displays information about the users existing in the system database. The Existing Users area **350** contains an Administrators area **355**, an Editors area **360**, and a Writers area **365**. The Existing Users area **350** shows that there is only one Administrator currently in the system, denoted by a user identifier, the link "Ben" **356**. Preferably, the link "Ben" **356** indicates the name of the user and also provides a link to the user's Home page. Because the Editors area **360** contains no links, no editors are currently recognized by the system (e.g., not stored in a user database). Similarly,

because the Writers area **365** contains no links, there are no writers currently in the system.

FIG. **4** shows an Add or Name Users page **400**, which is the Add or Name Users page **300** after editors have been added to the Editors area **360** and writers have been added to the Writers area **365**. Identical numbers in the figures refer to the same element. In the exemplary Add or Name Users page **400** shown in FIG. **4**, within the Editors area **360**, a user identifier "Bill" **361** and its associated Delete key **362**, and a user identifier "Charlie" **363** and its associated Delete key **364** have been added. Within the Writers area **365**, a user identifier "Matt" **366** and its associated Delete key **368** and a user identifier "Jane" and its associated Delete key **369** have been added.

FIG. **5** shows the Administrator's Home page **500**, in accordance with an embodiment of the present invention, after books have been added to it. The Administrator' Home page **500** differs from the Administrator's Home page **200** in that it has modified "Current 'What's Up' Links" area **235**, Library area **550**, and People area **560**. The Current "What's Up" Links area now contains a first area **535** and a second area **540**. The first area **535** contains a link http://www.important_vendor_site.com **531**, a comment **532**, and a Delete key **533**. The second area **540** contains a link http://www.important_media_site.com **541**, a comment **542**, and an associated Delete key **543**. The information contained in the first area **535** and the second area **540** were added by entering the information into the appropriate fields in the Add "What's Up" Link area **215** and selecting the Add key **224**.

The Library area **550** contains a plurality of entries **550**A, **550**B, **550**C, and **550**D. The entry **550**A has a Title area **551**, an Editor area **552**, a Status area **553**, and a Due Date area **554**. The Title area **551** contains a title identifier **551**A and a table of contents (TOC) link **551**B. Preferably, the title identifier **551**A and the TOC link **551**B are both URLs, each containing the address of a Web page on the VPN. As shown in FIG. **5**, the title identifier **551**A has the URL "Installing Optical Router Model PT67" and the table of contents identifier **551**B has the URL "TOC". The Editor area **552** contains the text "Charlie". The Status area **553** contains a display indicating that the book titled "Installing Optical Router Model PT67" is 40% complete. The Due Date area **554** contains text **554**A displaying that the due date is May 10, 2004 and also contains a Delete button **554**B.

Similarly, the People area **560** contains one entry **560**A having a Name field **561** containing the user identifier "Bill" **561**A, a Rank field **561**B containing the text "Editor", thereby identifying the user "Bill" as an editor, and an average status field **561**C, containing a status bar indicating that the average status for all the projects that Bill is working on is 30% complete.

FIG. **6** is a screen shot of a Table of Contents page **600**, which can be loaded, for example, when a user selects the TOC link **551**B of FIG. **5**. The Table of Contents page **600** contains a Title area **615**, an Editor area **620**, a Due Date area **630**, and a Task area **640**. The Title area **615** contains a book identifier "Calibrating Optical router PT**67**", the Editor area **620** contains the pull-down menu **625** from which an editor can be selected, and the Due Date area **630** contains a Due Date button (not shown). The Task area **640** contains an Insert New button **635** and other buttons (not shown). When the Due Date button is selected, a drop-down calendar **641** is displayed, indicated by a clock **642** on the scheduled due date. By selecting another date on the pull-down calendar **641**, a new due date is scheduled.

FIG. **7** is a screen shot of the Table of Contents Page **600** after the Insert New Button **635** has been selected. As shown in FIG. **7**, when the Insert New Button **635** has been selected, a pop-up **650** appears. The pop-up **650** contains a text area **651** for entering the title of a new chapter and an OK button **652** which the user selects after entering the title in the text area **651**.

FIG. **8** is a screen shot of a Table of Contents page **800** after multiple Chapters and sections have been added using the Insert New button **635** of FIG. **7**. As shown in FIG. **8**, The Table of Contents page **800** contains a Header area **801** and a plurality of sections **810** and **820**. While FIG. **8** shows the Table of Contents page **800** containing two sections **810** and **820**, it will be appreciated that the Table of Contents page **800** contains one section or more than one section if appropriate. The Table of Contents page **800** preferably contains more than two sections. In the embodiment shown in FIG. **8**, each section corresponds to a chapter in a book, with each section containing sub-sections. It will be appreciated that each sub-section can itself contain sub-sections or other units of organization.

The Header area **801** contains a Title area **805**, an Editor area **806**, and a Due Date area **807**, which have been explained above in reference to FIG. **7**. The section **810** contains a first part **811**, a second part **812**, a third part **813**, a fourth part **814**, a fifth part **815**, and a sixth part **816**. As described below, the parts are organized hierarchically, as chapters and sections in a book. It will be appreciated that in accordance with the present invention, parts are alternatively organized using other relationships. The first part **811** contains an Insert New button **811**A, a Search button **811**B, a title "Chapter 1: Overview", an editor pull-down menu **811**D, and a reorganization section **811**E. The editor name shown in the editor pull-down menu **811**D is shown as the user with the user identifier "Bill" but can be changed by selecting another user identifier using the pull-down menu **811**D. Pull-down menus such as the pull-down menu **811**D are used to assign each corresponding Chapter, Section, or Sub-section to a Writer or an Editor. Preferably, Editors also have access to this functionality. Everyone in the Administrator's group, including the Administrator, appears in this list. The reorganization section **811**E has a left arrow button **811**E**1**, an up arrow button **811**E**2**, a right arrow button **811**E**3**, and a down arrow button **811**E**4**, each described in more detail below.

As shown in FIG. **8**, the book is arranged in a tree hierarchical structure. The book contains parts **810** and **820**. The part **810** contains a first part **811**, containing a first sub-part **812** and a second sub-part **814**. The first sub-part **812** contains two sub-parts, with titles in the fields **813**C**1** and **813**C**2**. The second sub-part **814** contains a two sub-parts, with titles in the fields **815**C**1** and **815**C**2**.

Each part of the book has an Insert New button and a Search button. When the Insert New button is selected, the system will generate a new part in the same hierarchical level as that of the section from which the Insert New button was pressed. Thus, for example, if the Insert New button **813**A is selected, a pop-up menu **860** is displayed. The pop-up menu **860** is titled "Sub-section 1.1.3", indicating that the new section will be on the same level as the other parts in **813**. After the user inputs a title into field **861** and selects the OK button **862**, a new section 1.1.3 with the entered title is created and displayed in the Table of Contents page **800**.

When a user selects the Search button **811**B, a search page (FIG. **17**) is displayed. Here, the user is able to search through all of the documents a client has created in the system, select text chosen from search results, and import the search result into the current book by selecting the "Add to Book" button (e.g., FIG. **18**, elements **1821**, **1822**, or **1823**). Thus, in accordance with the present invention, a user is able to import

search results directly into an existing document, without copying and pasting. Thus, unlike prior art systems, a user within a first document does not have to search on a search term within a library of target documents, load a target document containing the search term, navigate to the location where the search term is located, copy the desired text, close the target document, reload or toggle to the first document, and paste the copied text into the desired location. These prior art steps will be repeated for each document within the library containing the search term. It will be appreciated that the methods and devices in accordance with the present invention obviate these steps, reducing document generation time and minimizing errors. Searching and importing search results in accordance with the present invention are discussed in more detail below, for example, in the discussion of FIGS. **17** and **18**.

The reorganization section **811**E allows a user to re-order chapters, sections, and sub-sections. The left-arrow key **811**E**1** and the right-arrow key **811**E**3** move the sub-section 1.2.3 within the hierarchy. For example, referring to FIG. **8**, if the left-arrow key **811**E**1** is selected once, the sub-section 1.2.3 is made a section, on the same level in the hierarchy as "Chapter 1: Overview". Alternatively, if the right-arrow key **811**E**3** is selected once, the sub-section 1.2.3 will become a sub-section of its section, e.g. sub-section 1.2.3.1. When a user clicks once on the up-arrow key **811**E**2**, the sub-section 1.2.3 is moved to a higher sub-section, thus becoming sub-section 1.2.2; the previous section 1.2.2 becomes the new sub-section 1.2.3. When a user clicks once on the down-arrow key **811**E**4**, the sub-section 1.2.3 is moved to a lower sub-section, thus becoming sub-section 1.2.4; the previous section 1.2.4 becomes the new sub-section 1.2.3.

The pull-down menus **811**D, **812**D, **813**D**1**, and **813**D**2** are used to allow an Administrator or Editor to assign each chapter, section, or sub-section to a writer or an editor. Each pop-down menu includes the name of everyone in an Administrator's group, including the Administrator.

Referring again to FIG. **5**, when a user selects a book title, he is brought to a corresponding Book Overview page. Thus, for example, if the user selects the title identifier **555**A "Calibrating Optical Router Model PT67", the Book Overview page **900** shown in FIG. **9** is automatically loaded and displayed to the user. The Book Overview page **900** has a Title area **905** and a plurality of entries **910**, **915**, **920**, **925**, and **930**, arranged in a hierarchical fashion. The Book Overview page **900** also contains a Task area **960** and a Document area **970**. The first entry **910** has a Title element **910**A containing the text "Chapter 1: Overview", a Who element **910**B containing the text "Bill", a "% Complete" element **910**C containing a task bar indicating a 60% completion percentage for the entry, a "Date last Changed" element **910**D containing the date Jan. 14, 2004, a "Comment Posted?" element **910**E containing the text "No", a "Feedback Request?" element **910**F containing the text "No", and an Approved element **910**G containing the text "No". The entries are arranged in the same hierarchical fashion as shown in FIG. **8**.

The Comment Posted element **910**E refers to a comment that the writer input at the comments interface next to the creative interface on the Writing page **1300** (FIG. **13**) that he or she is working on. Selecting the link opens the Writing page, with the section being discussed in the writing panel and the comment in the appropriate comment panel. Similarly, the Feedback Request element **910**F means that the writer working on the section asked the Administrator (Ben) to read this and give feedback. Selecting the appropriate link preferably does the same thing as selecting the "Yes" link next to it, opening the Writing page with the section in question in the test box. The name is made a link so that the user can more easily find the feedback requests directed to him.

Elements contain text or identifiers. Thus, for example, the entry **930** has a "Comment Posted?" element **930**E containing the Comment identifier Yes, which hides a link to a comment posted on another page. Thus, when a user selects the Yes identifier contained in the element **930**E, the Web page containing the comment is automatically loaded so that the user is able to read it.

The task area **960** contains a "Go to TOC" button **960**A, a "Preview" button **960**B, a "Save As" button **960**C, and a "Make Live for Searches" button **960**D. When a user selects the "Go to TOC" button **960**A, the system will load the Table of Contents page for the current book. For example, if the user clicks on the "Go to TOC" button **960**A, the Table of Contents page **800** shown in FIG. **8** will be loaded. When a user selects the "Preview" button **960**B, the document, finished or not, will open as a Web page. If a user selects the "Save As" button **960**C, a pop-up window **1000**, shown in FIG. **10**, will we displayed. As shown in FIG. **10**, the pop-up window **1000** contains a text field **1010** and an "OK" button **1011**. After the user enters a file or other name into the text field **1010** and selects the "OK" button **1011**, an exact copy of the book currently accessed will be saved with the name input into the text field **1010**. The copy includes the text and information about the book including comments and assignment status information.

Again referring to FIG. **9**, if a user selects the "Make Live for Searches" button **960**D, all of the content of the current book is available to a search engine for searching. Preferably, only the Administrator is able to use the "Make Live for Searches" button **960**D.

Again referring to FIG. **9**, a user is able to publish a book in multiple formats. For example, when a user highlights the PDF box **970**A in the Publish area **970** and then selects the Publish button **970**F, the current book is published in PDF format. Similarly, if the user highlights the Rich Text Format box **970**B, the HTML box **970**C, or the XML box **970**D, and then selects the Publish button **970**F, the current book will be published in RTF, HTML, or XML, respectively.

FIG. **11** shows a Person Overview page **1100** for the user Ben. A Person Overview page shows the status of each section in the current book assigned to a particular user. Thus, the Person Overview page **1100** contains a user name **1101** and a Book Overview section **1105**. The Book Overview Section **1105** contains a title **1104** (here, "Calibrating Optical Router PT67") and a plurality of entries **1110**, **1120**, **1130**, and **1140**, an average completion area **1141** and a finished completion area **1142**. The Book Overview Section **1105** shows the sections of a book, in a hierarchical structure, similar to that shown in FIG. **8**. Each entry has a "Title" element, a "Who" element, a "% Complete" element, a "Date Last Changed" element, a "Comment Posted?" element, a "Feedback Request?" element, and an "Approved" element. Each of these elements is similar to similarly named elements in FIG. **9** and will not be further discussed in detail here. It will be noted that the Title elements in FIG. **11** contain Title identifiers, allowing a user to load the corresponding Web page by selecting the identifier.

FIG. **12** is a screen shot of a Writer's Home page **1200** for the user with the user identifier "Matt". The Writer's Home Page **1200** contains a What's Up area **1210** and a Status area **1220**. The Status area **1220** contains a plurality of entries including entry **1222**. The entry **1222** contains elements similar to those discussed above in relation to FIG. **11**. Underlined elements are links to sections that the user Matt is working on.

Selecting the underlined element will open the element in Matt's Writing page. Thus, for example, the Title element **1222**A contains a title "Chapter 2: Initial Testing". Selecting the title identifier **1222**A will open the identified section in Matt's Writing page. Thus, selecting the identifier "Chapter 2: Initial Testing" will load the Writing Page **1300** shown in FIG. **13**.

The Writing Page **1300** contains a link **1301** containing a URL to the page for "Calibrating Optical Router PT67", a link TOC **1302** to the table of contents for the book "Calibrating Optical Router PT67", a slider status bar **1307** which a user can slide to indicate how much of the section he has completed, a text section **1310**, a function area **1320**, a first comment section **1330**, a second comment section **1340**, a select drop-down menu **1341** and a post button **1342**. The text section **1310** contains the text for the section titled "Chapter Two: Initial Testing". Within the function area **1320**, the B button **1320**A, the I button **1320**B, and the U button **1320**C are used to bold, italicize, and underline, respectively, portions of text within the text section **1320** that the user has highlighted. The Insert Image button **1320**D is used to insert an image at a location within the text section **1310** that the user has selected, preferably by placing the cursor at the location. The Insert Footnote button **1320**E is used to insert a footnote at a location within the text section **1310**. The Insert Table button **1320**F is used to insert a table at a location within the text section **1310**. The Insert file button **1320**G is used to insert a file at a location within the text section **1310**. The Spell Check button **1320**H is used to check the spelling of words, the Save/Preview Chapter button **1320**I is used to save and display in a Web format, and the Save button **1320**J is used to save the text within the text section **1310**. The first comment box **1330** displays a comment from the user with the user identification Bill, and the New comment box **1340** provides an area that the current user (here, Matt) can input a comment. The To pull-down menu **1341** is used to select a user that the new comment in the New comment box **1340** will be addressed to. The new comment will be posted when the user selects the Post button **1342**.

FIG. **14** displays a Writer's page **1400**, which represents the Writer's page **1300** after the user has selected the Spell Check button **1320**G shown in FIG. **13**. The Writer's page **1400** contains a pop-up window **1401** underlining misspelled words and allowing the user to replace a single occurrence of the misspelling or multiple occurrences of the same misspelling. FIG. **15** displays a Writer's page **1500**, the Writer's page **1300** after the user has selected the "Insert Image" button **1320**D shown in FIG. **13**. As shown in FIG. **15**, the user placed a cursor at the location **1509**, selected the "Insert Image" button **1320**D, and selected an image from a selection of images (not shown) presented to the user. After the user selected an image, the application puts at the chosen location the note: "Image: Photo of Back of Optical Router PT67". The application also places a link to the image in the list **1550**. If the user selects the link, an "Insert Image" interface (not shown) will be loaded from which the user can change the caption or the image.

FIG. **16** shows a Table Interface **1600** that pops up over the Writing page **1300** when a user selects the Insert Table button **1320**F of FIG. **13**. The Table Interface **1600** contains a drop-down menu that allows a user to format the rows, columns, borders cell padding, cell border, and table width for the table.

It will be appreciated that footnotes and tables are inserted into text in a format similar to that for inserting images. For example, if a table were embedded into the text, a message such as "Table: Settings and Variables for Initial Conditions" would be inserted into the text at a location where the table is to appear. A link to the table would be placed below the text area.

FIG. **17** shows a Search page **1700** that is loaded when a user searches through a book by, for example, selecting the Search button **636** of FIG. **7**. The Search page **1700** contains a Search Term section **1705**, a Date Range section **1710**, a Return section **1720**, a Search Area section **1725**, an Authored By section **1730**, a Search button **1750**, and a Back to Top button **1755**. In operation, a user is able to retrieve documents within the system (1) that contain one or more words by entering the words into the "With all the Words" text area **1701** of the Search Term section **1705**, (2) that contain an exact phrase by entering the phrase into the "With the exact phrase" text area **1702**, (3) that contain at least one word from among a group of words by entering the words into the "With at least one of the words" text area **1703**, (4) that do not contain one or more words by entering the one or more words into the "Without the words" text area **1704**, or (5) any combination of 1 through 4. In the example shown in FIG. **1700**, documents will be searched to find any that have the words "optimal" and "input" and "strength", preferably by using a Boolean AND search.

The user has the ability to select the date of the documents to be searched by selecting one of the check boxes in the Date Range area **1710**. In FIG. **1700**, the "Last three months" check box has been selected, instructing the system to search only those documents that were created within the last three months. Alternatively, the system would have checked within the system for documents that were created at any date or those created within the last year if the "Any time" check box or the "Last year" check box, respectively, were checked.

The user is able to select what document elements are returned by the search by checking an appropriate box in the Return area **1720**. For example, the system can return the title of the book, the title of a chapter, the title of a section, or the title of a sub-section where the search terms were found. In FIG. **1700**, the "Chapter" check box has been selected, indicating that the search will return the chapter where the search terms were found. The user is able to select what areas within a document are searched by the search engine by selecting the appropriate box within the Search Area **1725**. For example, all of the text within a document, only headings, only images, or only tables can be searched. In FIG. **1700**, the "All Text" check box has been selected, indicating that all of the text within a document will be searched. By selecting the appropriate box in the Authored By section **1730**, the user is able to instruct the search engine to search documents written only by selected authors. For example, the search engine is able to search documents written by anyone, by an administrator (chosen using the pull-down menu **1735**), by an editor (chosen using the pull-down menu **1740**), or by a writer (selected using the pull-down menu **1745**). In FIG. **1700**, the "Anyone" check box has been selected, indicating that the documents written by any author and satisfying the other search criteria will be searched. The search is initiated by selecting the Search button **1750**.

FIG. **18** shows a Search Result page **1800** for a search performed using the search criteria in FIG. **17**. The Search Result page **1800** shows the search phrase **1801** entered in the field **1701** of FIG. **17**, a first result **1820** and a second result **1840**. The first result **1820** shows the book title **1810**, chapter title **1811**, section title **1812**, and sub-section title **1813** for the section containing the search terms. The first few words of the result are also shown in a Result Text Area **1825**. Section **1840** of FIG. **18** also shows that "Chapter 2: Initial Testing", "Section 2.1 Determine Initial Conditions", "Sub-Section 2.1.1:

Input Strength" also contains the search term. "Chapter 1: Overview" can be imported into the current book by selecting the "Add to Book" button **1821**; "Section 1.1: Calibration Objectives" can be added to the current book by selecting the "Add to Book" button **1822**; and "Sub-Section 1.1.2: Optimizing Performance" can be added to the current book by selecting the "Add to Book" button **1823**.

If the user selected the "Add to Book" button **1822**, the application would save the heading and text for Section 1.1 and the heading and text for Sub-section 1.1.2. It would create a footnote at the end of each text showing normal footnote information for the source document. The headings would automatically appear in the Table of Contents of the book the user is creating, but with no one assigned to them.

The user is able to perform a new search or return to the table of contents by selecting the "New Search" button **1830** or the "Back to TOC" button **1835**, respectively.

In accordance with the present invention, a secondary user (e.g., a user other than an Writer, Editor, or Administrator) has the ability to search through documents within a system library but does not have access to the application. Thus, the secondary user can not write documents, edit documents, or perform administrative tasks relating to the documents. This secondary user must be registered and is given a session-specific ability to generate a booklet, which is a collection of search results that are published. Preferably, the system is configured to determine whether a secondary user has registered on a specific Web site and is accordingly able to access the search engine and any booklets. Alternatively or additionally, the system is configured to generate a separate registration page from which a secondary user registers and then accesses the search engine and any booklets. In contrast to a secondary user, as used herein the term "primary user" refers to a user that has access to the applications of the system. The term primary user thus refers to any one of an Administrator, an Editor, and a Writer.

FIG. **19** shows a Search Page (also called a Booklet) **1900** available to a secondary user. The Booklet **1900** is similar to the Search Page **1700**, but has a "Publish Booklet" button **1910**. After the secondary user enters the search criteria in a manner similar to that for the Search Page **1700** and selects the "Search" button **1908**, the Booklet **2000** shown in FIG. **20** is loaded and displayed. When search results are returned, as shown in the Booklet **2000**, each result is followed by an "Add to Booklet" button, such as the "Add to Booklet" buttons **2001**, **2002**, **2003**, and **2010**. Selecting any "Add to Booklet" button will cause the search result to be included in a session-specific PDF document. For example, selecting button **2001** will cause all of Chapter 1 and its sub-sections to be included in the secondary user's Booklet. Selecting button **2010** will cause Section 2.1 and all of its sub-sections to be included in the Booklet as well. Selecting the "Publish Booklet" button **2020** will allow the secondary user to download a PDF containing his search results. After selecting the "Publish Booklet" button **2020**, the pop-up display **2015** will appear, allowing the secondary user to title the Booklet.

FIG. **21** shows a Table 1 of entries **2101**-**2123** for XML tags that are generated when a user creates a document in accordance with embodiments of the present invention. Two element entries contain an XML tag in the left-hand column and examples of sections relating to these entries. Thus, for example, entry **2101** shows the XML tag <book>that would be assigned to the book titled "Calibrating Optical Router PT67". XML tags are automatically generated and inserted into the text when a user creates a section or other element. These XML tags allow a search engine to more efficiently search through a document and also allow a customized Web browser to render the formatted document correctly. For example, if a user chooses to search only images by, for example, selecting the check box "Only Images" in the Search Area **1725** in FIG. **17**, the search engine will perform searches only within the <image></image>tags, whose opening tag is shown in entry **2115** of Table 1.

It will be appreciated that documents can be formatted in ways other than by using the XML tags shown in FIG. **21**. For example, documents can be formatted using HTML tags, using control words used in RTF, to name a few formats that can be used in accordance with the present invention. Alternatively, documents do not have to be formatted but can contain unformatted text.

In operation, a user logs into the system and is brought to his home page. A first user, a Writer, logs in from a remote client location, where he is troubleshooting a router. He searches through documents in the system library for documents containing chapters on "How to Troubleshoot a Router." He finds these chapters by navigating to a search screen and entering the search terms "Troubleshoot" and "Router" or by entering the search phrase "How to Troubleshoot a Router." The user then imports the relevant chapters found by his search request into a Booklet, publishes the Booklet in PDF format, and prints the Booklet.

FIG. **22** is a block diagram of a system **2200** in accordance with one embodiment of the present invention. The system **2200** is coupled to a user host **2210** over a connection **2215**. The connection **2215** is (1) an internal connection such as when the user host **2210** runs on the same platform as the system **2200**, (2) a local area network connection such as used for an Ethernet LAN, (3) a wide area network connection such as used to connect hosts over the Internet, or (4) any other type of connection between two hosts. Preferably, the connection **2215** is a wide area connection comprising the Internet. The system **2200** comprises an interface **2225** coupled to a suite of application programs **2230**, which is coupled to a data repository **2235**. Preferably, the user host **2210** executes a Web browser and the system **2200** operates as a Web server. In the preferred embodiment, the interface **2225** is a Web-based interface. It will be appreciated that the interface **2225** can be another type of interface used to provide a graphical or other interface to the user host **2210**.

The data repository **2235** contains (1) documents (e.g., books) stored in a database, in XML formats, or in any other format suitable to store, retrieve, and edit documents, (2) document workflow information used to assign and track workflow for each document, (3) other information relating to documents including, but not limited to, comments and other files. The suite of application programs **2230** satisfies user requests through the interface **2225** to store, retrieve, edit, search through, and perform other functions on documents stored in the document repository **2235**. The suite of application programs **2230** also generates data to track and update progress on the documents. Thus, the suite of application programs can retrieve a document stored in the data repository **2235**, update comments related to the document and retrieved when the document is retrieved, generate current tracking and status information relating to the document, such as a new writer or due date, and perform other functions. The suite of application programs **2230** thus preferably comprises a document control portion for, among other things, editing the document and a workflow control portion for, among other things, tracking the workflow related to the document.

In operation, for example, a user on the user host **2210** generates a request to edit a portion of a document (e.g., a book section). In one embodiment, the request is generated by selecting an identifier such as a title of a book section. The

request, which consists of a link to the book section, is transmitted over the connection **2215** to the interface **2225**. The interface **2225** extracts the link and passes it to the suite of application programs **2230**. The suite of application programs **2230** retrieves the book section from the data repository **2235** and passes the book section on to the interface **2225**. For example, if the book section is stored in a database in the document repository **2235**, the suite of application programs **2230** formats an SQL command to retrieve the book section. If the book section is stored as a dynamic document, the suite of application programs **2230** generates the book section, passes it on to the interface **2225**, which then transmits it to the user host **2210** over the link **2215**.

In one embodiment, the interface **2225** is a part of the suite of programs **2230**. In other embodiment, the data repository **2235** is distributed across multiple hosts. Other embodiments are envisioned in accordance with the present invention.

It will be readily apparent to one skilled in the art that other modifications can be made to the embodiments without departing from the spirit and scope of the invention as defined by the appended claims.

I claim:

1. A system comprising a non-transitory computer-readable medium containing instructions for execution by a processor, the instructions comprising:

a document control module comprising a document engine for generating separate parts of a document, wherein the document engine comprises a search engine to search within the separate parts for a target using search criteria;

a workflow control module for assigning users to write or edit the separate parts and setting corresponding completion dates; and

a Web-based interface coupled to the document control module and the workflow control module, the Web-based interface to concurrently display a title for each of the parts and a list of selectable users for assigning to each of the parts.

2. The system of claim **1**, wherein the workflow control module provides a plurality of sets of functions to be performed on the parts of the document, each set of functions corresponding to a type of a user.

3. The system of claim **2**, wherein a first type of user has a corresponding first set of functions, the first set of functions comprising adding a user to the system, adding to the system a book capable of being updated electronically with text and images, and assigning work to a user to write or edit parts of the book.

4. The system of claim **3**, wherein a second type of user has a corresponding second set of functions, the second set of functions comprising assigning work to a user and opening a part of a book for writing and editing.

5. The system of claim **4**, wherein a third type of user has a corresponding third set of functions, the third set of functions comprising writing a part of the book and reporting a completion status for work on the part of the book.

6. The system of claim **1**, wherein the workflow control module comprises a plurality of panels, each panel associated with a workflow for one or more parts of the document.

7. The system of claim **6**, wherein a first panel from the plurality of panels contains an identifier corresponding to a location of a second panel from the plurality of panels.

8. The system of claim **7**, wherein the identifier comprises a link to the second panel.

9. The system of claim **8**, wherein the first panel comprises a first Web page, the second panel comprises a second Web page, and the link comprises a uniform resource locator for the second Web page.

10. The system of claim **6**, wherein at least one of the plurality of panels comprises a comment field.

11. The system of claim **1**, wherein the document comprises markers.

12. The system of claim **11**, wherein the markers correspond to headings within the document.

13. The system of claim **11**, wherein the markers comprise SGML tags.

14. The system of claim **13**, wherein the SGML tags are XML tags.

15. The system of claim **13**, wherein the SGML tags are HTML tags.

16. The system of claim **11**, wherein the markers are rich text format control words.

17. The system of claim **11**, wherein the document engine comprises a formatting engine configured to automatically embed the markers within the document at locations selected by a user from the Web-based interface.

18. The system of claim **1**, further comprising a host coupled to the Web-based interface, the host configured to execute a Web browser.

19. The system of claim **18**, wherein the host is coupled to the Web-based interface over a local area network.

20. The system of claim **18**, wherein the host is coupled to the Web-based interface over a wide area network.

21. The system of claim **20**, wherein the wide area network comprises the Internet.

22. The system of claim **18**, wherein the host is coupled to the Web-based interface over a secure channel.

23. The system of claim **22**, wherein the secure channel comprises a virtual private network.

24. The system of claim **1**, wherein the document engine is configured to import an object into the document in response to a command received on the Web-based interface.

25. The system of claim **24**, wherein the object comprises at least one of a sound file, an image file, a table, and a video clip.

26. The system of claim **1**, wherein the workflow control module comprises a Library area containing a book identifier, a corresponding status display, and a corresponding due date.

27. The system of claim **1**, wherein the workflow control module comprises a Book Overview panel containing a plurality of entries, each entry having a title area, a user owner area, and a status area.

28. The system of claim **27**, wherein the status area contains a completion percentage area.

29. The system of claim **1**, wherein the document control module comprises a publishing engine configured to publish the document in a format selected by a user.

30. The system of claim **29**, wherein the selected format is one of PDF, Rich Text Format, HTML, and XML.

31. The system of claim **1**, wherein the search criteria comprises at least one of a date range, a search term, a search area, a user type, and a user identity.

32. The system of claim **31**, wherein the user type is one of an administrator, an editor, and a writer.

33. The system of claim **31**, wherein the search engine is configured to display a location within the document where the search term is found.

34. The system of claim **33**, wherein the search engine is configured to display a marker and text corresponding to the location of the search term within the document.

35. The system of claim 34, wherein the marker corresponds to a heading within the document.

36. The system of claim 35, wherein the heading corresponds to at one of a book heading, a chapter heading, a section heading, and a sub-section heading of a book.

37. The system of claim 36, wherein the search area is one of text, a heading, an image, and a table.

38. The system of claim 36, wherein the document control module is configured to import the result of one or more searches into the document.

39. The system of claim 38, wherein the Web-based interface is configured to allow both a primary user and a secondary user to access the search engine.

40. The system of claim 39, wherein the system is configured to collect one or more results of searches into a booklet.

41. The system of claim 40, wherein the system is configured to format the booklet and transmit the formatted booklet to a host computer.

42. The system of claim 41, wherein the formatted booklet is a PDF file.

43. The system of claim 1, wherein when one of the list of selectable users is assigned to a part, the Web-based interface displays the assigned user when displaying the part.

44. A system comprising:

a computer device comprising a document control module, a workflow control module, and a Web-based interface coupled to the document control module and the workflow control module, wherein the document module comprises a document engine to generate a hierarchically organized multiple-part document and to access each of the multiple parts of the document, the workflow control module to assign users for writing or editing the multiple parts and to set corresponding completion dates, and the Web-based interface to concurrently display a title for each of the parts and a list of selectable users for assigning to each of the parts, the document engine further comprising a communications module to communicate workflow information.

45. The system of claim 44, wherein the workflow control module is also to track ranges of progress on the writing or editing of the multiple parts.

46. The system of claim 44, wherein the workflow control module displays titles of the multiple parts in a hierarchical manner.

47. The system of claim 46, wherein the titles are links to the parts.

48. A system comprising:

a workflow control module comprising a non-transitory computer-readable medium containing computer-executable instructions for selecting titles for parts of a document, arranging the parts in a user-selectable hierarchical structure, assigning work on the parts to one or more users, and tracking a range of progress of the work;

a document control module comprising a document engine comprising a non-transitory computer-readable medium containing computer-executable instructions for changing content in the parts of the document and displaying the content; and

a Web-based interface for accessing the workflow control module and the document control module, the Web-based interface to display a title for each of the parts and a list of selectable users for assigning to each of the parts.

49. The system of claim 48, wherein each title is linked to an associated user page for displaying and changing a corresponding part of the document.

50. The system of claim 48, wherein the workflow control module comprises a page that displays, for each of the parts, a title identifier selectable to access the part, a continuous completion status, and a due date.

51. The system of claim 48, wherein the workflow control module comprises a single interface operable to insert new parts into the document, rearrange the hierarchical structure of the parts, and to search within the parts for content.

52. The system of claim 51, wherein the hierarchical structure is designated by headings and sub-headings.

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